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Chicago, June 22, 1929 (*Issued Every Other Week*) Volume XXXII, No. 13

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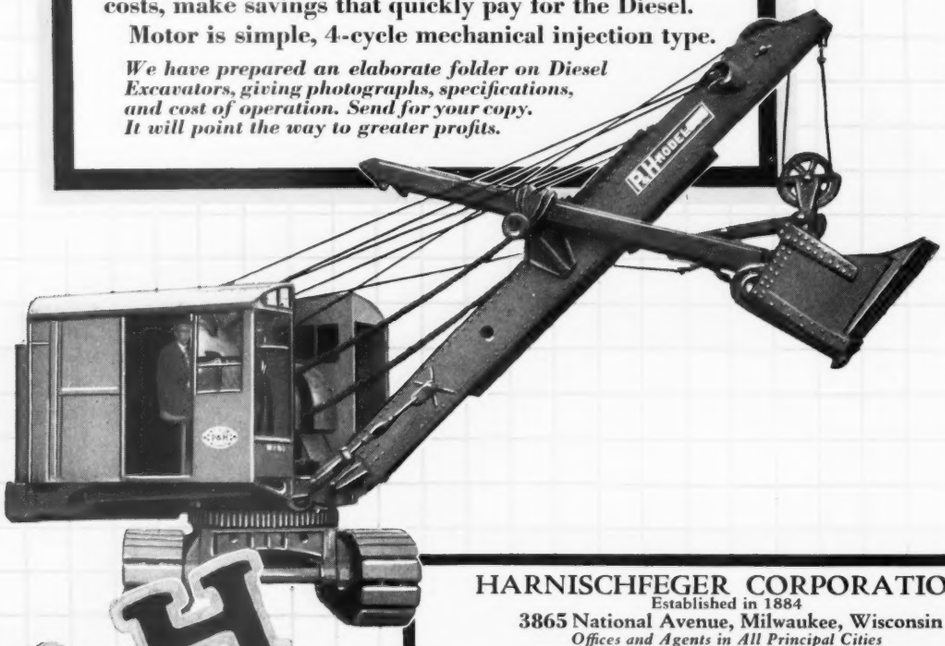

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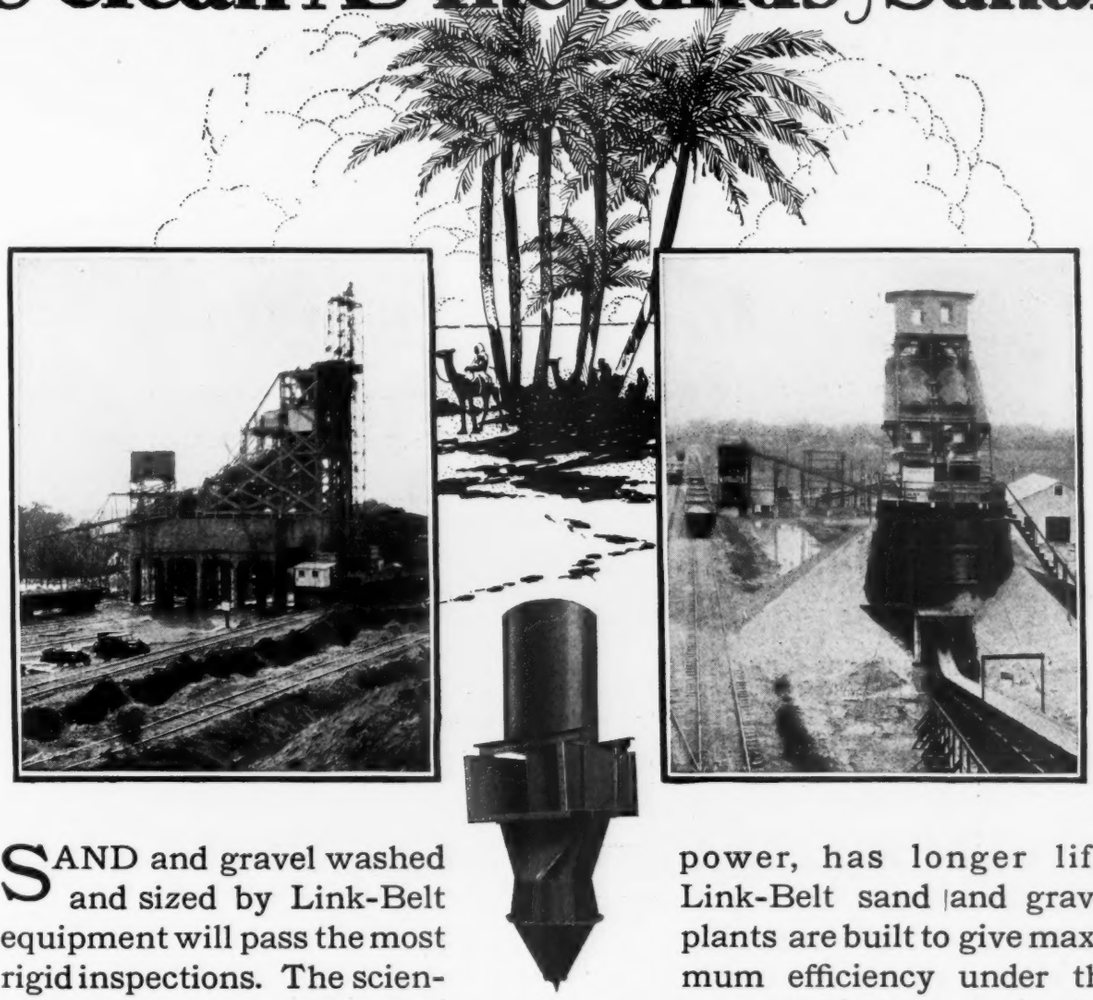

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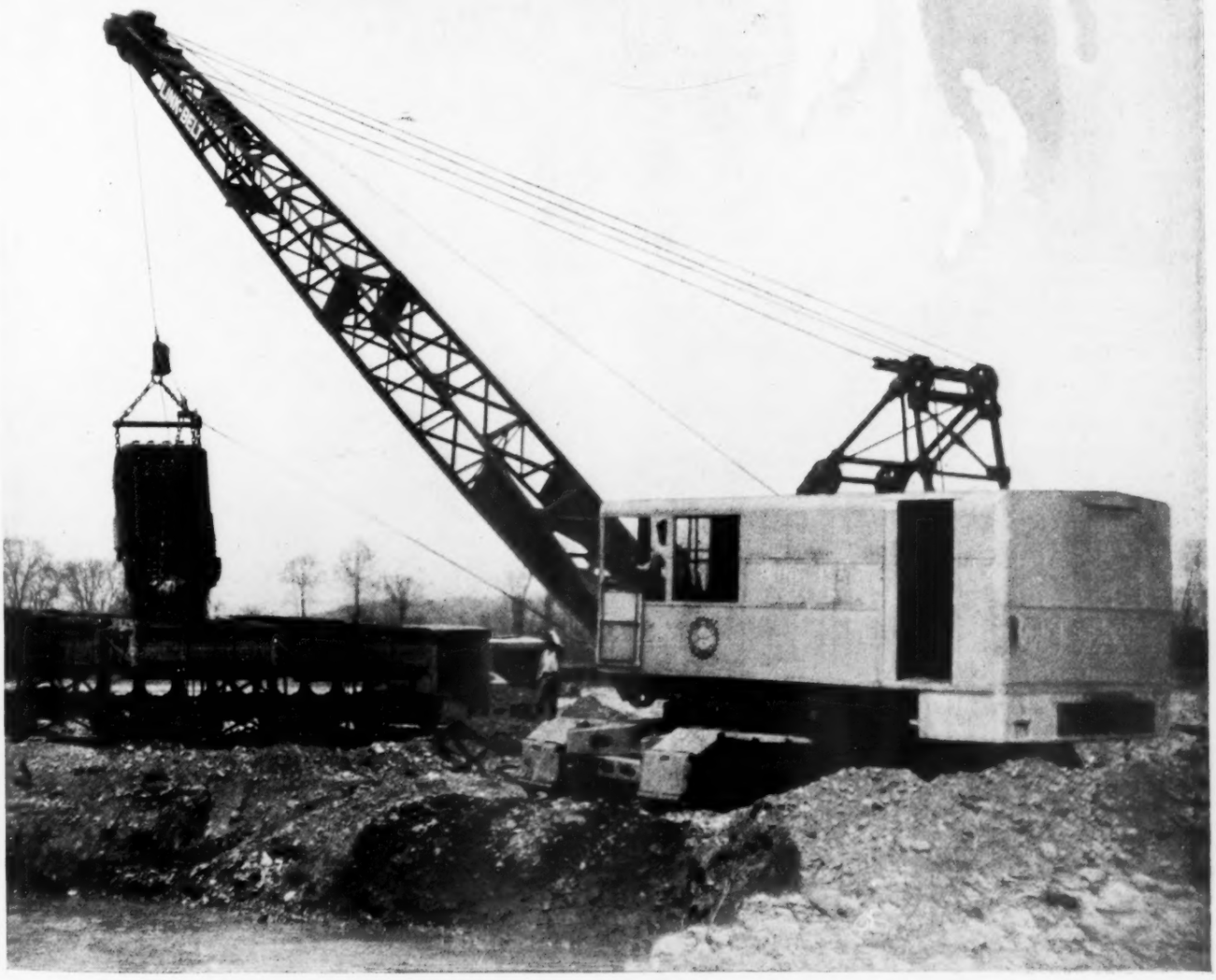
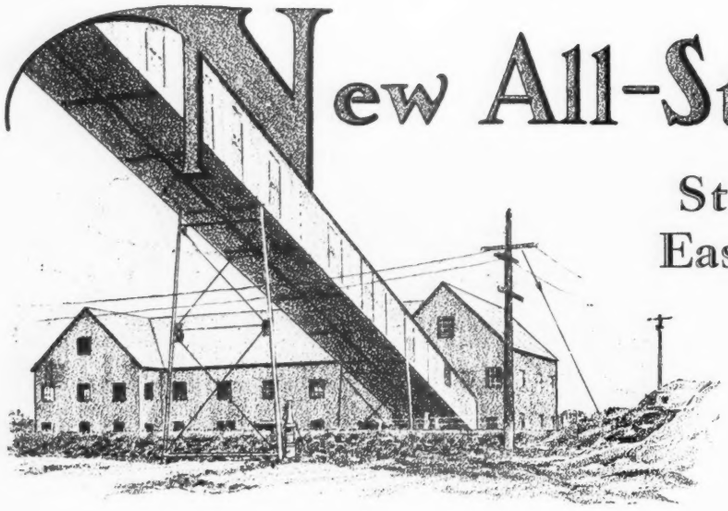


Excavating material at the Sterling Creek plant, Eastern Rock Products, Inc.



New All-Steel Sand and

Sterling Creek Plant of Eastern Rock Products, Inc.

Cramped Location Required Special Design—State Highway Divides Processing and Shipping Units—Crushing and Screening Done in 35 Ft. of Headroom—Plant Painted Aluminum "Sterling" Silver

ONE of the newest and most notable sand and gravel plants in upper New York state is that of the former Boonville Sand Corp. (now a part of the Eastern Rock Products, Inc.) at Sterling Creek.

The location of the plant was decided upon because this site provided the two chief essentials for a good operation—extensive deposits of good material and adequate transportation facilities. The main highway between Albany and Buffalo passes directly through the property, and the main line of the New York Central railroad skirts the plant on the south. Besides this, the Barge canal passes directly south of the property, affording an unusual opportunity for water shipping.

From the foregoing it will be seen that unchangeable physical conditions largely controlled the design of the plant: A state highway bisecting the deposit on the north; railroad and loading point on the south; Sterling Creek on the west. The material had to be prepared on one side of the highway and transported to the other side for shipment.

Sterling Creek is a small water-course coming down from the hills to the north and carrying with it an abundance of good glacial gravel. The deposit is made up entirely of this creek bottom material and generally is of a very good character. As would be expected from this type of deposit, there is some driftwood and other debris brought down by the stream, but this is negligible and is readily removed in going through the plant. Every year the creek brings down a fresh supply of material, largely filling up the previous excavations. The average run of the deposit is 30% sand and 70% gravel, the latter being quite well rounded, indicating its glacial origin. Some boulders up to 16 in. in diameter are encountered, but there are not many of these.

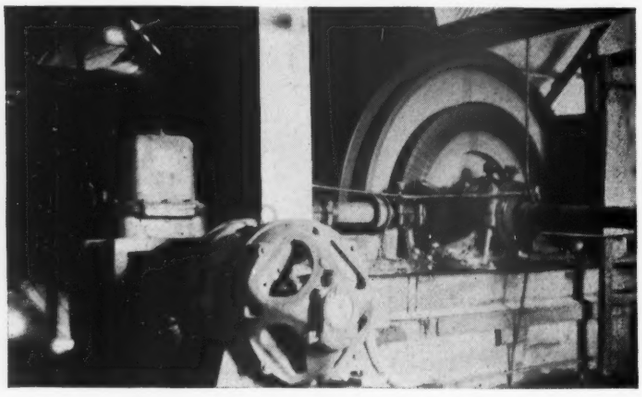
Deposit—Excavation

No stripping is necessary at this operation, as the gravel surface is very thinly covered or completely exposed. The part now being worked is that nearest the plant and is enclosed with the pit track, which is a complete loop having its longest dimension extending up the creek. Beyond the north end of this loop the creek comes down through considerably more of the company's property, which is said to contain the best of the deposit. This part of the deposit is to be worked as soon as convenient, but at present the company is operating near the plant in order to create a needed water supply pond. To the west of the deposits in the creek bottom there are 60 acres of fine meadow land owned by the company which will be available for operation when the need comes. This land has an average overburden of 2 ft., but beneath that test holes have shown that there is 16 to 20 ft of exceptionally good gravel. At the present rate of operation it will probably be at least 15 years before this part of the deposit will ever be touched.

The material is loaded in the pit by a Link-Belt Model K-55 dragline, equipped with a 2-cu. yd. Page bucket. The dragline is a full-electric unit, driven by a 100-hp. Lincoln motor which was specially installed at the request of the company. Power is supplied at 440 volts.

Full-electric dragline excavating pit material

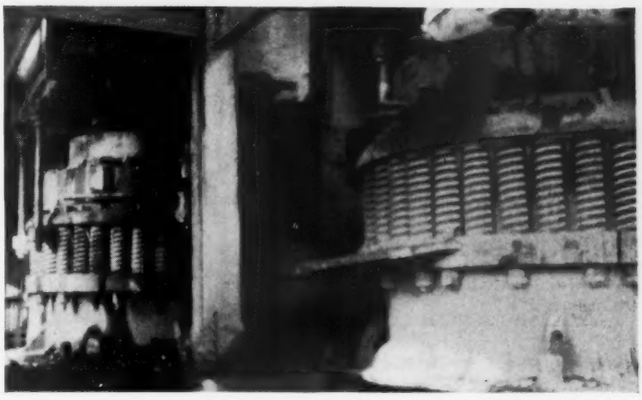
The power arrangement in the pit is decidedly unusual. A 3-wire high voltage (4000 v.) line is run out from the main power line at the plant to the far end of the pit. This line is placed on poles at the east edge of the pit so that it need not be disturbed no matter where the dragline is operating in the pit. From a point half way out to the end of this line, a lateral line has been tapped in, which runs straight out to the center of the pit and dead-ends. A similar lateral line runs to the center of the creek bottom from



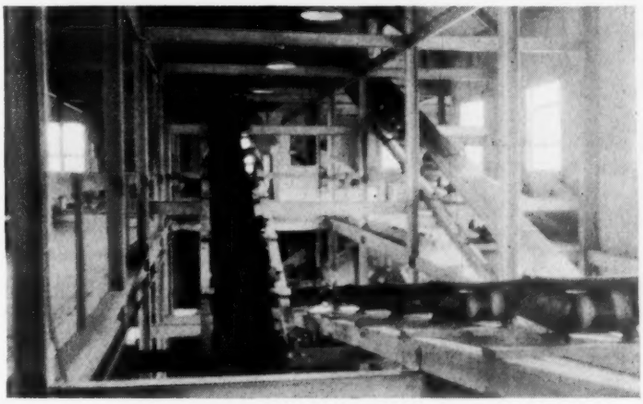
Primary scalping screen and its drive

Gravel Plant With Novel Features

the far end of the main line. From either of these two laterals, power for the dragline can be supplied, and if it is necessary to work right at the location of the lateral poles they can easily be removed at a small cost without in any way disturbing the main pit line. The portable transformers can be attached to the end of either of the lateral lines readily, or at any other hole along the entire power line and from them the service cable can be carried directly to the dragline. The line from the transformers to the dragline is 1000 ft. of "Superservice," rubber-covered cable supplied by the Rome Wire Co. By this arrangement of the lines, high voltage power can be brought right to the pit, and, moreover, the two lateral lines provide an excellent opportunity to reach to all parts of the pit easily. The portable transformer set does away with the necessity of an expensive transformer set at each lateral, and also permits the removal of the lateral poles much more easily if that should become necessary.



Primary and secondary gravel crushers



Parallel conveyors feeding the vibrating screens

The dragline loads to Western Wheeled Scraper Co. side-dump pit cars of 5-yd. capacity. Trains are made up of 6 cars each and hauled by 8-ton, 36-in. gage Plymouth gasoline locomotives. As mentioned above, the pit track is roughly circular in shape. The locomotives pull the cars always in the same direction (clockwise), so that there is no necessity for the usual troublesome switches and crossovers. The only switch is the one at the plant leading to the car storage track. This arrangement does away with the possibility of one train getting in the way of another at crossovers and switches, since one locomotive is always dumping its cars at the plant hopper while the other is having its cars loaded in the pit. As an example of the completeness of detail at this plant, it is noted that a standard gasoline pump has been installed beside the pit track near the plant hopper so that the locomotives can refuel with the least possible waste of time.

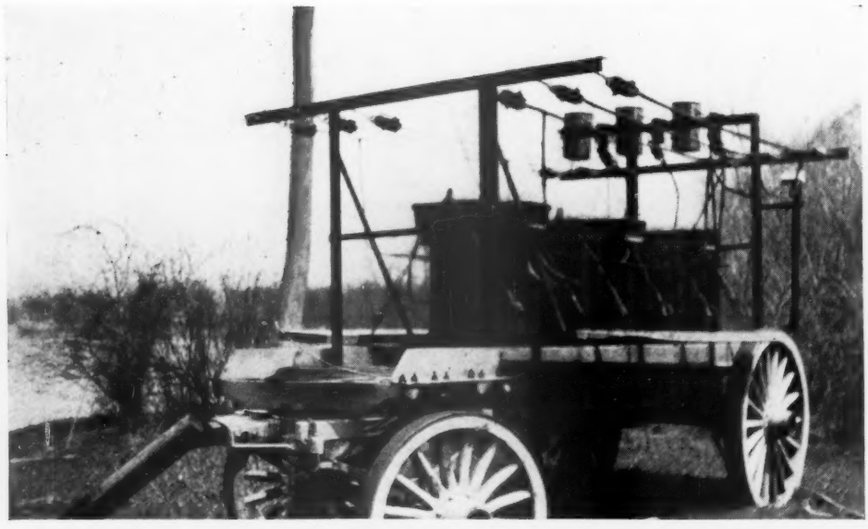
Screening and Crushing

The pit cars dump to a 10-in. grizzly of railroad rails. Here the larger stones are removed and placed to one side to be broken by hand later by the two men employed at the grizzly. There is an electric hoist over the far side of the track at the grizzly used to aid in dumping the cars when the load happens to lean the wrong way. The material passing through the grizzly drops to a Robins plate feeder that feeds it to the 30-in. conveyor which takes it up to the scalping screen. Equipment for this conveyor and the others in the Sterling Creek plant, was manufactured by the Robins Conveying Belt Co. Unless otherwise noted, all the belts move at a standard speed of 200 ft. per minute.

A short way up this conveyor, a man has been stationed to remove debris and mud balls from the material on the belt. There are occasional mud balls coming from the pit, probably caused by the teeth of the bucket biting a little too deeply and bringing up some of the undersoil from beneath the gravel. These balls are removed as thoroughly as possible, but even when they do pass through the plant no harm is done, according to the company's engineers, who have experimented by permitting large quantities of mud to pass through, with no bad effects. The mud is of such character that it breaks up readily in the washer so that the material is carried off in the waste water and no trace of the mud is found in the product. The finished material is very clean and free of deleterious substances.

The material is carried up on the 30-in. belt, in a fully enclosed gallery, to the scalp-

General view of the new Sterling Creek plant of the Eastern Rock Products, Inc.

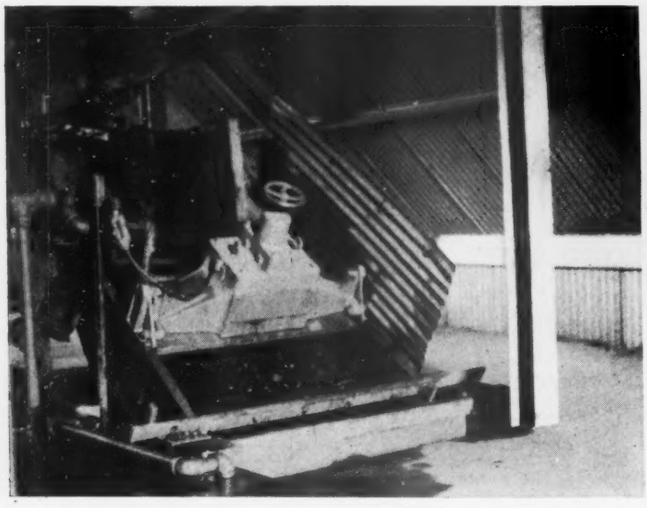


Power is supplied to any excavator location by this portable transformer which can be tapped into the main line where needed

ing screen, which is a 6x20-ft. Galland-Henning, rollerless rotary with screen plates. This screen has four sections, the first being a scrubber section, the next two having ¾-in. holes, the last having 1½-in. holes. The ¾-in. sections are jacketed, the jackets having ¼-in. holes. All the holes are round, punched-plate perforations.

The 30-in. conveyor is driven by a 20-hp. Westinghouse motor, while the screen is operated by a 25-hp. motor of the same make. Both are driven through Cleveland worm-gear speed reducers, the former by a 10 to 1, 17-hp. reducer, and the latter by a 21½ to 1 ratio reducer. Speed reducers are used extensively at the Sterling Creek plant, there being five in operation there. These cover practically all points where speed reducers could reasonably be used, and help materially in both the economy and safety at the plant, since the belt drives have been entirely eliminated.

A 4-in. stream of water enters each end



Top screen of one of the vibrating screen batteries

The two middle screens of the parallel batteries

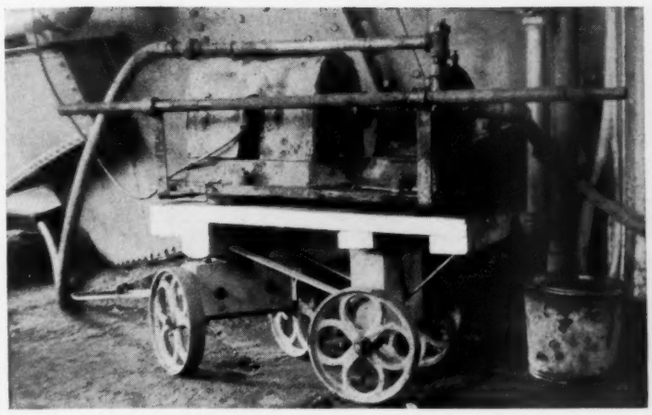
(All sizing at this plant is done in two batteries of vibrating screens)

Vibrating screens over the storage bins for removing excess of fine gravel according to New York state highway specifications

of the Galland-Henning screen from a cross in the water supply line beside the screen. This screen takes out all the sand and gravel sizes of minus 1½ in. A total of 400 g.p.m. of wash water is supplied this screen.

The fine material from the jacket drops through a hopper to a 12-in. flume which carries it to the sand washer at the far end of the building. There is a scraper of sponge rubber in contact with the return side of the 30-in. belt at the head pulley, and the material which this removes from the belt also passes to the sand flume, as it is all fine sand.

The material rejected by the jacket and that passing through the ¾-in. and 1½-in. sections drops directly to a 20-in. conveyor belt which takes it to the vibrating screens on the top floor at the other end of the building. In dropping down to the conveyor this stone is bypassed around the secondary crusher, although a gate in the chute permits the stone being sent to this crusher if



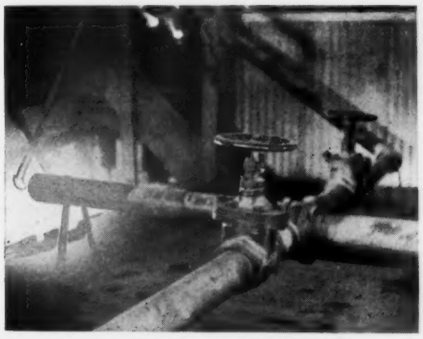
Portable pumping outfit to remove water from the sumps below the screens and crushers

The three conveyors between the main plant and bins which carry crushed gravel and uncrushed material

desirable. The function of the secondary crusher is described farther on.

The oversizes from the revolving screen pass directly to a 5½-ft. Symons cone crusher, driven by a direct-connected 150-hp. Westinghouse motor. This material is from 1½-in. size up, and is completely crushed and then discharged to a 20-in. belt conveyor leading up to the upper floor at the other end of the building.

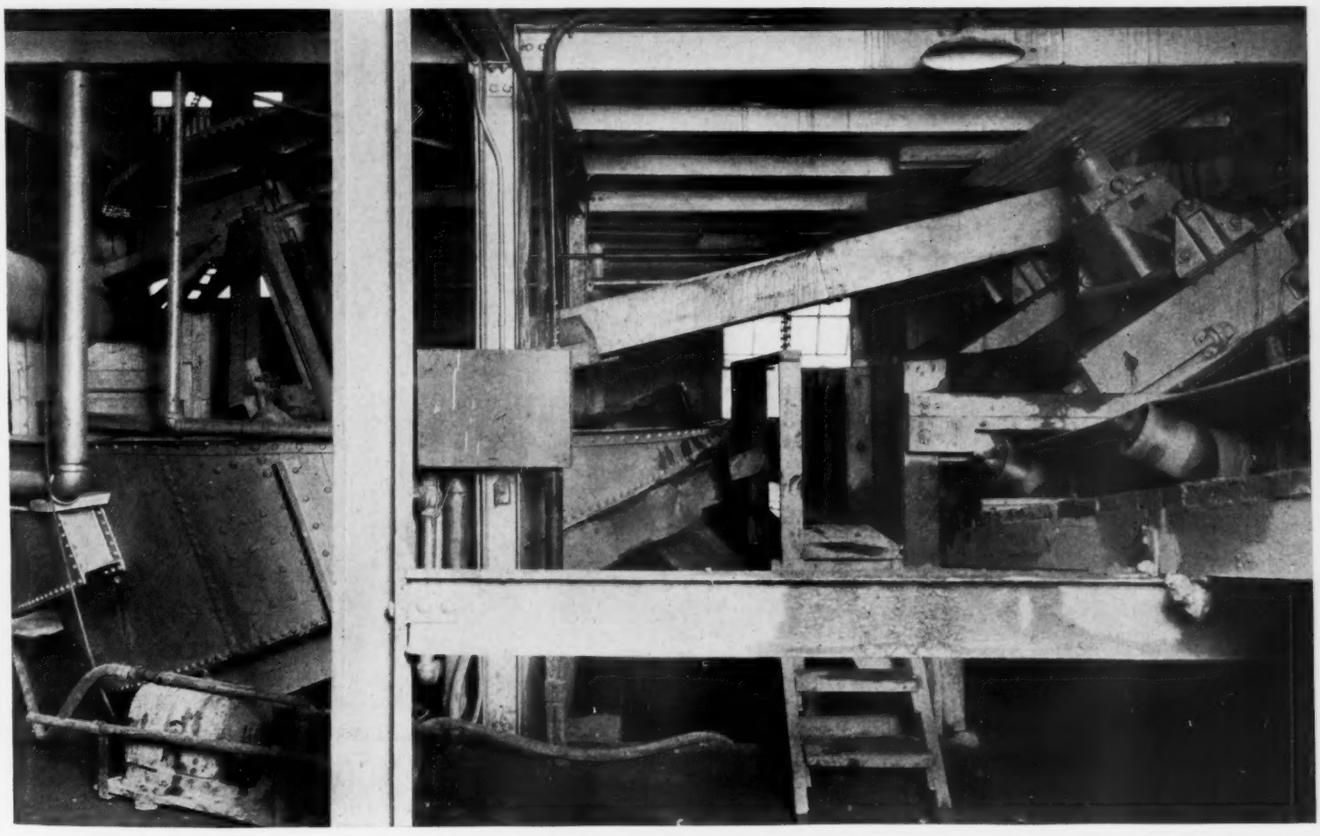
The product of the 5½-ft. cone crusher, which is crushed stone to all practical purposes, is reelevated to the opposite end of the building, where it is again washed, and the oversize taken out and returned to the crusher



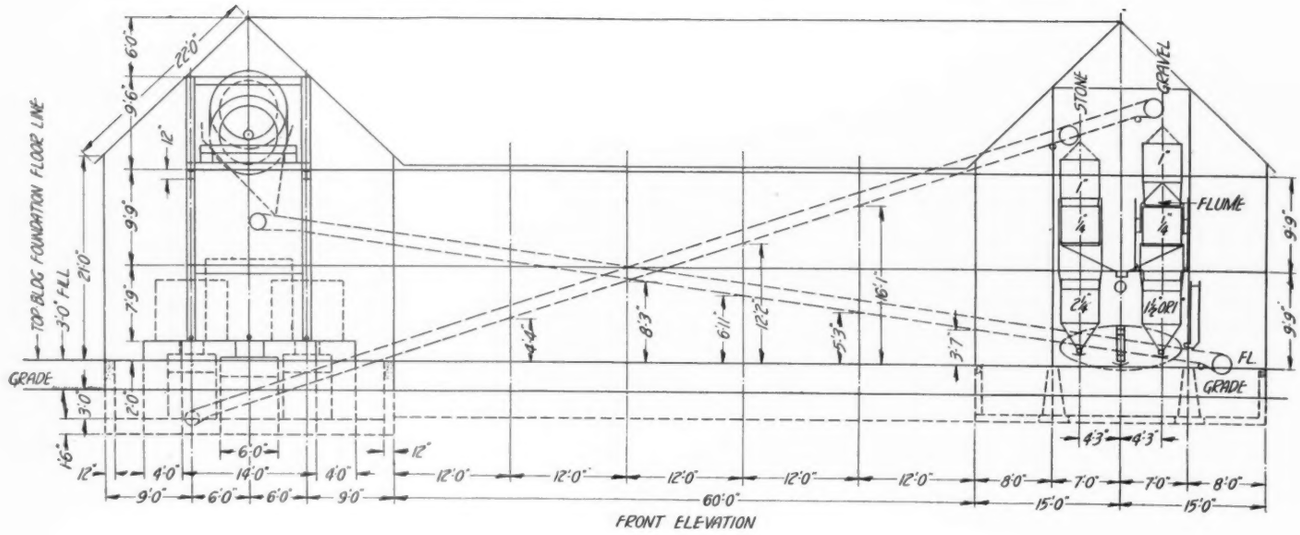
Water line and cross feeding rotary scalper and belt wiper

end of the building for reduction in a 4-ft. Symons cone crusher, driven by a 100-hp. Westinghouse motor, placed beneath the rotary scalping screen. This crusher in addition to taking all the oversizes from the primary crusher can take the regular flow of minus 1½-in. gravel and reduce it to desired sizes. All the product of the secondary crusher is reelevated to the opposite end of the building for sizing.

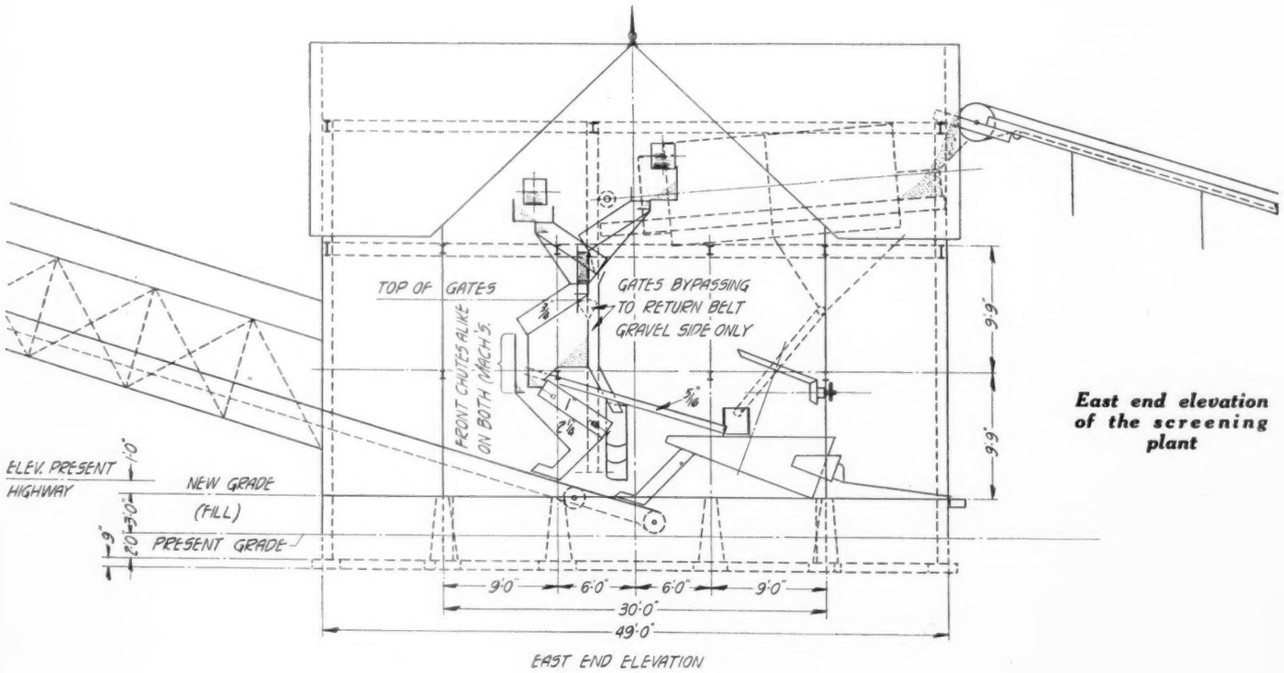
The two 20-in. conveyors mentioned in the two paragraphs above mark the start of a parallel or dual system in the plant, one carrying uncrushed gravel and the other carrying crushed gravel. The systems are



Left—Sand washer and, right—The lowest pair of the dual battery of vibrating screens. The conveyor at the right carries oversize gravel to the secondary crusher



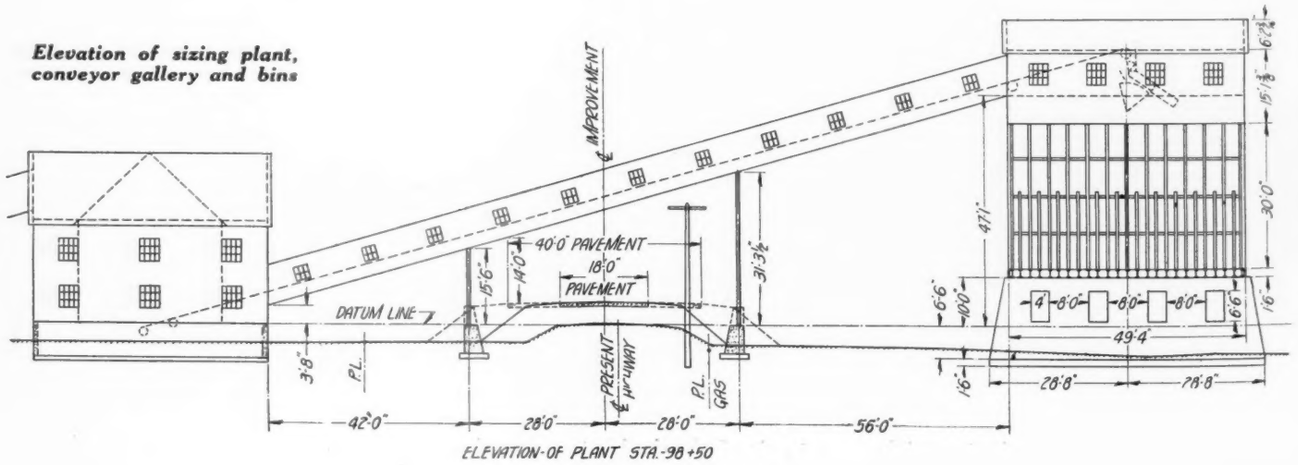
FRONT ELEVATION



EAST END ELEVATION

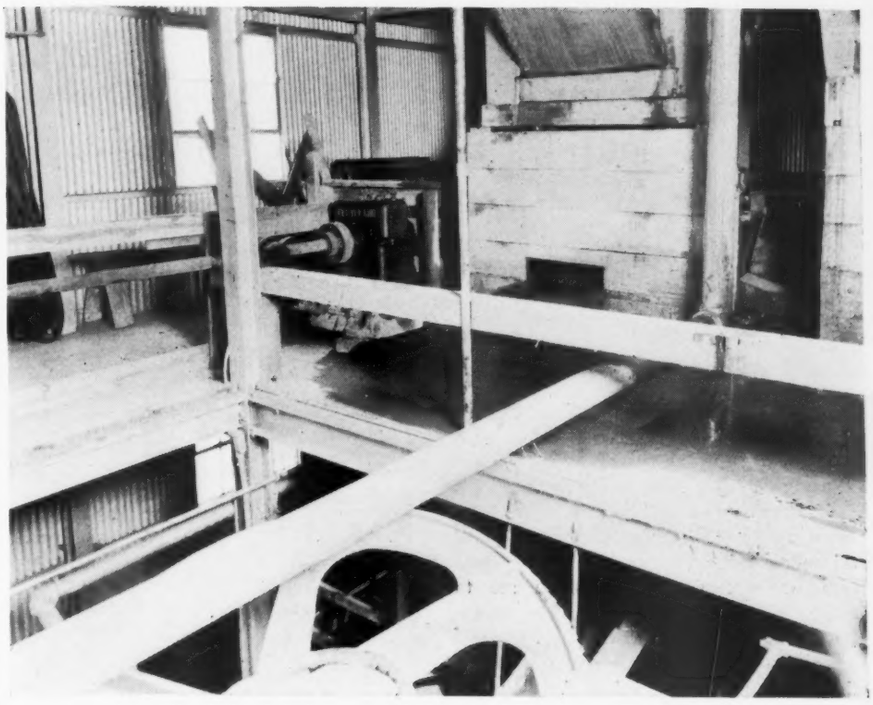
East end elevation of the screening plant

Elevation of sizing plant, conveyor gallery and bins



ELEVATION OF PLANT STA. 98+50

identical throughout, but the two types of materials do not come together again and are eventually sent to separate bins in the storage building. These two conveyors run parallel to each other to the east end of the building and are driven by the same 15-hp. Westinghouse motor through another Cleveland speed reducer. Each conveyor delivers its material to a battery of three "V-32" Tyler "Hum-mer" screens. The mesh in the parallel batteries are the same for the corresponding screens and hence the sizing accomplished is the same for crushed or uncrushed gravel. The top screen of each series is of 1-in. mesh. The material passing through this screen passes to the second screen, which is 7/32-in. mesh. The oversize of the first screen bypasses the middle screen and falls to the third screen which scalps out the oversize. The sized materials are carried on the bridge belt conveyors to the storage bins.



The 12-in. sand flume delivers to the box shown here, located on the floor above the sand washer

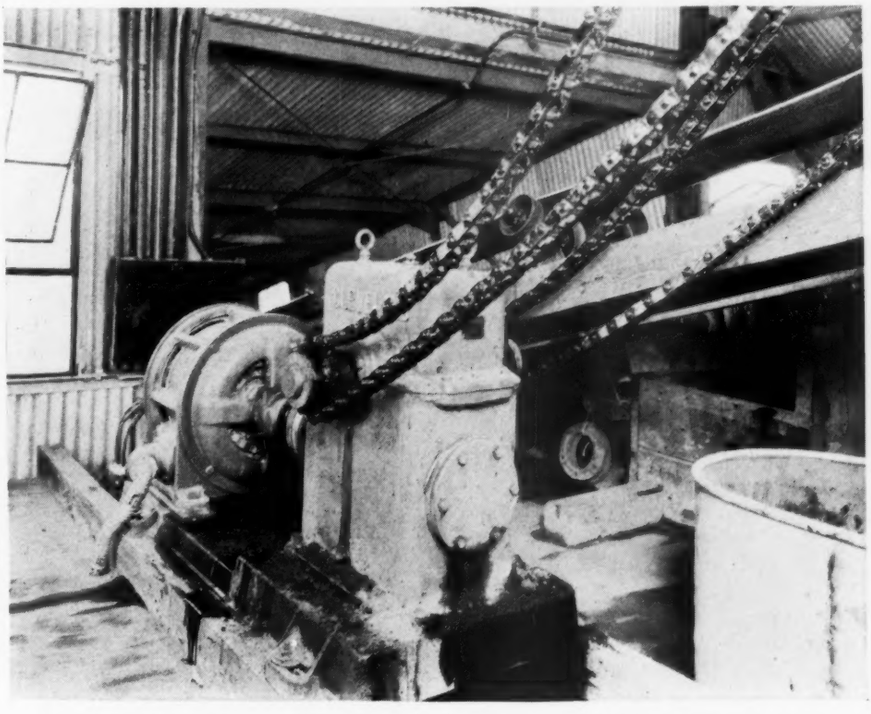
Sand Recovery

Returning to the sand production side of the plant, we find a very interesting washer installation. The 12-in. sand flume carries the material 96 ft. from the Galland-Henning screen and delivers it to a steel-lined box above a "Dorrco" washer. This box is 4x6x4 ft. in size and has a 3-in. slit cut in one side near the bottom to permit the water and sand to discharge to the washer. The Dorrco washer is 12 ft. 3 in. in diameter, inside, and is the Dorr Co's type "B-3." It is operated at a speed of 1 r.p.m.

The washer is driven by a 15-hp. Westinghouse motor through a Cleveland speed reducer. The motor and reducer, which are located on the floor immediately above the washer, also operate the return belt from the vibrating screens to the secondary crusher. The conveyor is driven through its tail pulley by a chain from the reducer, while the washer is driven by a shaft with a chain drive at the outer end.

The Dorrco washer receives material from three sources: The wash water from the scalping screen, containing all the creek sand; the flows from the two batteries of vibrating screens, containing the crusher sand. After dewatering the sand flows to a third 20-in. bridge belt to the bins on the opposite side of the highway.

Clear water for washing and the waste water from the sand dewaterer are each handled by an 8-in. split-body, double-suction Morris Machine Co. centrifugal pump, each driven by a 40-hp. Westinghouse motor. Lack of area prevented sluicing off the waste water by gravity as is usually done. The waste is pumped from a sump to a settling basin.



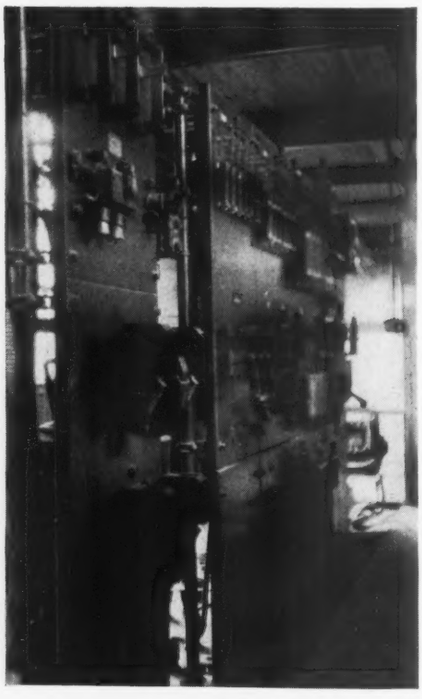
Head end of the three parallel conveyors running from the crushing and screening building to the top of the storage bins

There are three parallel conveyors leading from the ground floor of the crushing and screening building to the top of the storage bins. These conveyors, which are 200 ft. long, center to center, are enclosed in a corrugated steel passageway, of construction similar to that of the rest of the plant buildings. The center one of these conveyors receives the sand directly from the Dorrco washer and discharges it to the first bin in the storage building. The two outside conveyors carry the material from the two batteries of vibrating screens, one taking the crushed gravel and one the uncrushed. These conveyors are driven at the head end by a single 30-hp. General Electric motor through a Cleveland speed reducer with a 10 to 1 reduction. As the center belt is a few feet shorter than the other two, separate chains and sprockets are used to drive the different head pulleys from the speed reducer. On these belts, as on the others in the plant,

Recovering stone from cars on the plant siding for stockpiling

there are sponge-rubber wipers on the return side to remove any adhering particles and send them down to the bins.

The two outer belts deliver the crushed and uncrushed gravel to a pair of Tyler Hum-mer screens which can be set to produce desired separation of sizes in the bins, the crushed gravel always being on one side and the uncrushed on the other. Another Hum-mer screen below the first one



Main remote control switchboard

on the crushed gravel side makes further separation possible. The material passing through and the rejects from the screens drop directly to their respective bins. This battery of screens is directly over the bins and its main function is to separate the No. 1 and No. 2 gravel, and to take out of the crushed-stone circuit a certain amount of No. 1's to keep the state highway specification road mix of the correct proportions.

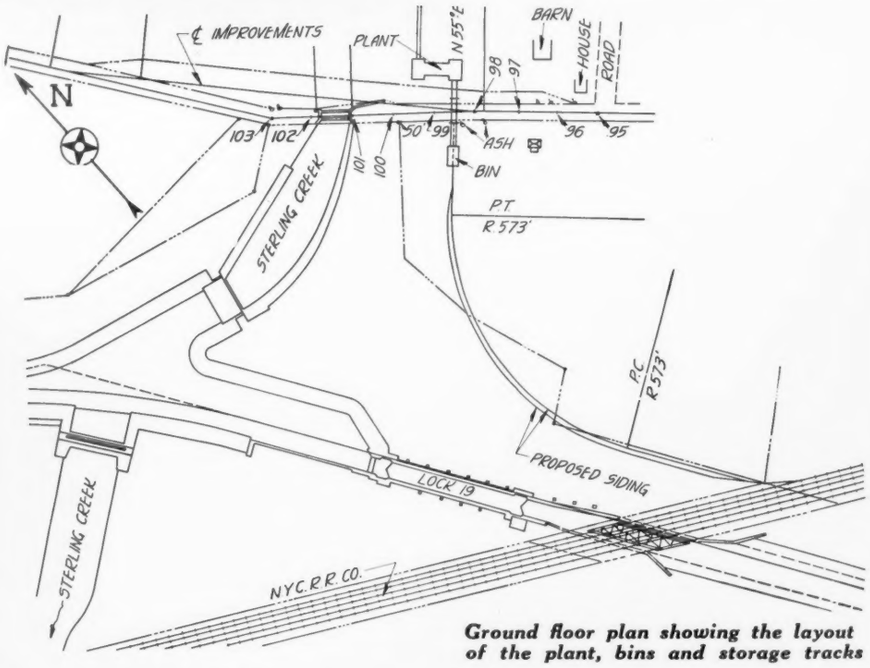
All belt conveyors except the one feeding the scalping screen are standardized at 20-in.; all have standardized cast-iron, Timken roller-bearing idlers; all take-ups are of the end or tail drum type, and all run on an 18-deg. angle.

Storage and Shipping Facilities

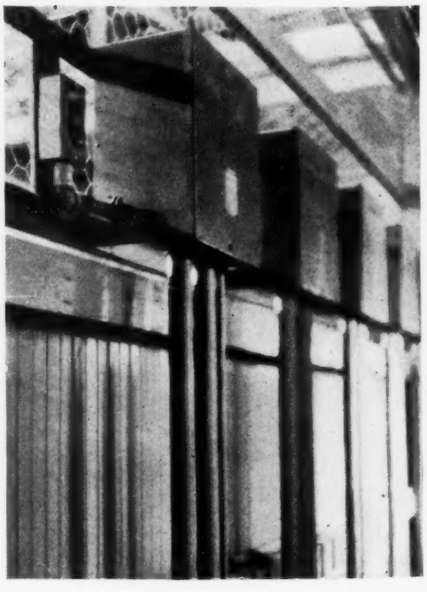
The storage bins are erected on a concrete foundation, and the entire framing and floor members are of structural steel. The flooring, siding and partitions are of 4-in. longleaf pine, treated with a preservative. The superstructure, containing the final sizing screens and the head ends of the three conveyors, is made of corrugated iron siding and roofing. There are eight bins in two rows of four each. The bins are of special design, with a total capacity of 1800 tons, with bin pockets 30 ft. deep—thus requiring exceptionally rugged side walls and partitions. This was accomplished by using 8-in. H-columns of steel throughout with girths or whalers of 12-in. and 15-in. I-beams. These were placed inside, instead of outside, as is usual, for the sake of appearance. Underneath the center of the bins is a single railroad track where railroad cars can be loaded from any of the eight bins. On either side are chutes for truck loading.

The plant stock-piles considerable of its material to the south of the storage house by means of a Link-Belt K-42 crawler crane, which unloads cars from the plant and also reclaims the material with a 1½-yd. Hayward bucket. The cars are shifted by a 20-ton, standard-gage, Plymouth gasoline locomotive, which handles both the cars for stock-piling and those taken down to the plant siding for shipment.

The layout of the plant limits the amount of trackage possible between the plant and the New York Central main line. By putting the storage bins to the south of the



Ground floor plan showing the layout of the plant, bins and storage tracks



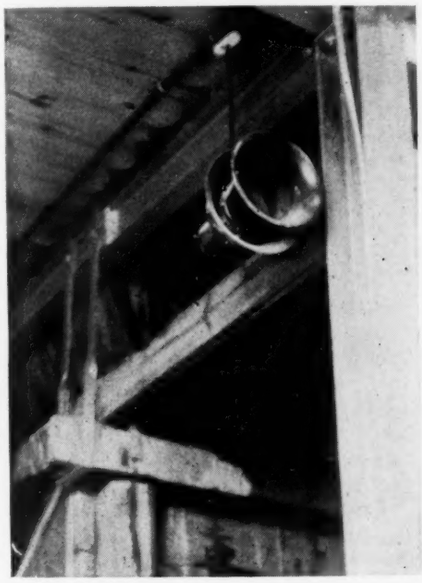
Starting control switches are arranged in the proper order for safe starting the whole plant

highway a grade crossing for the plant outlet was eliminated, but at the same time it cut down the space available between the plant and the canal. By using a 10 deg. curve the track to the plant could be connected to the main line without much trouble.

Getting the storage bins south of the highway permitted bridging the road with the three enclosed conveyors from the screens. Thus the plant does not in any way interfere with the road, although the pit material is brought in from one side and the finished product is shipped out from the other side. Considering the size of the plant, there has been excellent utilization of available space.

Summary

The plant has no elevators; no transmission belting; all washing, screening and crushing is done under a headroom of 35 ft.



One of the fire sirens used to signal or call men in the plant

The buildings are specially designed with steel framing on heavy H-columns so placed around the scalping screen and crushers as to aid in their erection and the handling of repair parts. (The heaviest part of the cone crusher weighs 17 tons.)

The plant is operated entirely by electricity, which is purchased from a power company at Utica, six miles away. A transformer station beside the plant steps it down to 440 volts for use in the plant. There is a control room with walls of heavy mesh screening which admits the light but protects the equipment, and this contains all the control panels for the whole plant. These are set in the correct starting order so that a man starting up the machinery only has to throw the switches one after another to set the equipment in motion in reverse order, thus eliminating the danger of overloading some unit due to incorrect starting.

An unusual feature, for a sand and gravel plant, is the very complete switchboard which distributes 800 hp. at 440 volts to the various pieces of equipment (and for future installations). All wiring is in conduit, passed by the underwriters.

Besides the main remote control station, there are also control buttons beside each machine, which permits cutting out the adjacent equipment or, in an emergency, stopping the whole plant. Tests have shown that any one machine in the plant can be cut out for as long as a minute without any danger of the material piling up too much behind it; but for longer periods the whole plant must be shut down.

In connection with the other electrical equipment must be mentioned the electric fire sirens placed at convenient points around the plant for signaling. Each employe has his own particular call—like the rings on a country telephone party line—and he is supposed to answer his call immediately, wherever he happens to be. There are also signals for starting and stopping the plant and for emergencies. The starting signal is sounded just before the machinery is put in motion, so that every man will be warned and can stand clear of any belts or dangerous equipment he may be working over at the time.

Safety Measures

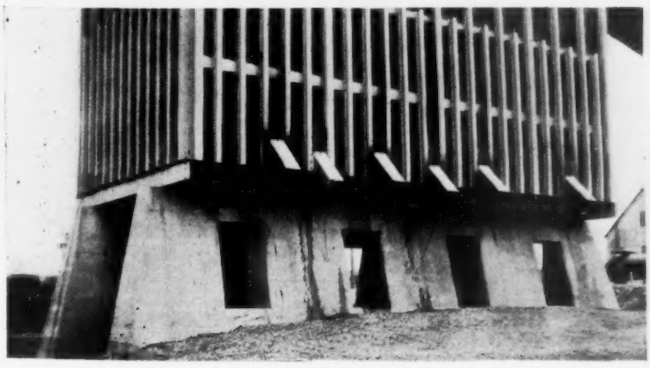
Besides the siren warning, other safety measures have been taken throughout the plant. Wherever there is a belt, chain or moving gear, a guard of wood and wire mesh has been installed. A warning sign prohibits the men from the dangerous practice of riding on belts. Fire extinguishers are placed at convenient points around the plant. The management has thus taken every precaution to safeguard the men (starting by building the plant large enough so there is plenty of room to work safely around all the equipment) and the men have co-operated by heeding the warnings and working safely. Each new employe is carefully instructed in his new job the first day by the superintendent, and no little part of this instruction is on safety. The result is that the company has not had to pay a single accident compensation claim to date.

One of the safety warnings in the plant

The working force at this plant is made up of only 16 men, including the clerk in the office and the night watchmen.

Besides the main plant buildings described there is a small repair shop, of the same type of construction.

Construction of a hopper and belt conveyor over the Barge canal will soon be started, so that barges may be loaded on the canal. The material will be hauled from the plant bins or stock pile by motor truck.



Storage bins showing the facilities for loading to railroad cars and trucks

The local office which is maintained near the plant

Particular attention was given all steel work. Instead of the usual shop coat of questionable quality paint, red lead and linseed oil was used as a base coat, and aluminum paint with spar varnish was used for the finish coat. By this color scheme it was proposed to capitalize the name "Sterling" Creek, since the word "sterling" is a trademark the world over for *quality;* the aluminum paint gives a silver finish to the entire plant!

Construction Personnel

The plant was designed by J. H. Wagoner, engineer and general superintendent for the Boonville Sand Corp. All construction work, with the exception of the steel and sheet metal work, was done by the company's own forces. Contracts for the steel work, etc., were awarded to the Andrews Iron Co. of Utica. Clyde Powers, formerly chief operator of the Forestport plant, was placed in charge of the work, and thus grew up with the plant. Mr. Powers was ably assisted by Elmer Brown, who looked after form construction and concrete work, and Ward Yeomans, who was responsible for all electrical work. Work on the foundations was started in March, 1928, and the plant was in operation by August 1.

Construction was carried on somewhat under difficulties, as the company could not get the permit for a siding from the railroad until the plant was practically completed. This necessitated the shipping of sand and gravel for the concrete from the other Boonville plants to Utica and the trucking of it out to the plant, six miles away. All other material was trucked out in the same fashion. In setting up the equipment in the plant an interesting use was made of the crawler crane. The boom of this crane, carrying a heavy motor or other piece of equipment, was run right through the window nearest the spot where the machine was to be set up and the machine was lowered to its seat without the least trouble.

A small local office is maintained beside the plant, but the main office of Eastern Rock Products, Inc., is in Utica. The company's officers are: President, treasurer and general manager, Harold V. Owens; vice-president and sales manager, Albert S. Owens; vice-president, Henry R. Beebe; secretary, George F. Ferris; general superintendent, Latham B. Gray, Oriskany Falls, N. Y., in charge of Plants 5, 6 and 7; superintendent, J. H. Wagoner, Boonville, N. Y., in charge of Plants 1, 2, 3 and 4.

Notable Safety Records Achieved by Mines and Quarries

THE RECORDS achieved by a number of mines and quarries in operating over long periods of time without injuries to employes or with remarkably low accident rates, while participating in the National Safety Competition held during 1928 under the auspices of the United States Bureau of Mines, are characterized by Secretary Lamont of the Department of Commerce as "a definite and substantial contribution to safety in industry in the United States," in congratulatory letters addressed to the participating companies. Three large iron mines in Michigan, an Oklahoma zinc mine, a Kansas zinc mine, three nonmetallic mineral mines in Ohio, Missouri, and West Virginia, and 34 quarries and open-pit mines in Alabama, California, Indiana, Kansas, Michigan, Missouri, New Jersey, New York, Ohio, Pennsylvania, Texas, Virginia, and Washington were operated throughout the year without a single accident involving loss of working time by an employe. Two hundred and eighty-four mines and quarries, located in 35 states, were represented in the contest. The total amount of exposure to hazard was more than 91,000,000 man-hours. Commendatory letters were written by Director Scott Turner, of the Bureau of Mines, to various mines and quarries awarded honorable mention.

The 1928 contest marked the fourth holding of the National Safety Competition, which has as its purpose, through the medium of friendly rivalry, the reduction of the number of personal injuries in the mines and quarries of the United States. Competing companies were grouped into five classes, namely, anthracite mines, bituminous coal mines, metal mines, nonmetallic mineral mines, and quarries and open-pit mines. An artistic bronze trophy, "Sentinels of Safety," the gift of the *Explosives Engineer* (magazine), is awarded to the winning company in each group. The winner in each group was the mine or quarry whose record showed the smallest loss of time from accidents in proportion to the total amount of time worked by all employes.

The competition for the trophy was restricted to mines employing at least 50 men underground and to quarries and open-pit mines employing at least 25 men in the pit.

The best record among mines producing nonmetallic minerals other than coal was made by the Ironton limestone plant of the Alpha Portland Cement Co., Ironton, Ohio. At this plant 115,020 man-hours were worked without a single accident.

In the nonmetallic mine group, honorable mention was given the Manheim mine of the Alpha Portland Cement Co., Manheim, W. Va., which also had no lost-time accidents; the Lower Gypsum mine of the United States Gypsum Co., Southard, Okla.; and the North Holston mine of the Beaver Products Co., Inc., North Holston, Va.

Among the quarries and open-pit mines, the operation establishing the best record was the Wakefield iron mine of the Wakefield Iron Co., Wakefield, Mich., which employed 125 men and worked 283,680 man-hours without a lost-time accident.

In this group, honorable mention was given the following named contestants, none of which sustained a lost-time accident: The Ormrod quarry of the Lehigh Portland Cement Co., Ormrod, Penn.; the Fordwick quarry of the Lehigh Portland Cement Co., Fordwick, Va.; the Cape Girardeau quarry of the Marquette Cement Manufacturing Co., Cape Girardeau, Mo.; and the New Castle quarry of the Lehigh Portland Cement Co., New Castle, Penn.; the Fogelsville quarry of the Lehigh Portland Cement Co., Fogelsville, Penn.; the Birdsboro quarry of the John T. Dyer Quarry Co., Birdsboro, Penn.; the Birmingham quarry of the Lehigh Portland Cement Co., Tarrant City, Ala.; the Marcem quarry of the Pennsylvania-Dixie Cement Corp., Gate City, Va.; the Superior quarry of the Superior Portland Cement Co., Concrete, Wash.; the Vulcanite quarry of the Vulcanite Portland Cement Co., Phillipsburg, N. J.; the Speed quarry of the Louisville Cement Co., Speed, Ind.; the Greenport quarry of the Knickerbocker Portland Cement Co., Hudson, N. Y.; the Petoskey quarry of the Petoskey Portland Cement Co., Petoskey, Mich.; the Dallas quarry of the Trinity Portland Cement Co., Dallas, Texas; the Bloomville quarry of the France Co., Bloomville, Ohio; the Catskill quarry of the North American Cement Corp., Catskill, N. Y.; the Iola quarry of the Lehigh Portland Cement Co., Iola, Kan.; the Cowell quarry of the Cowell Portland Cement Co., Cowell, Calif.; the Bonneville quarry of the Lawrence Portland Cement Co., Northampton, Penn.; the Sandts Eddy quarry of the Lehigh Portland Cement Co., Easton, Penn.; the Birmingham quarry of the Alabama Portland Cement Co., Birmingham, Ala.; the Bath quarry of the Lehigh Portland Cement Co., Bath, Penn.; the Union Furnace quarry of the American Lime and Stone Co., Tyrone, Penn.; the Howes Cave quarry of the North American Cement Corp., Howes Cave, N. Y.; the West Coplay quarry of the Lehigh Portland Cement Co., West Coplay, Penn.; the No. 4 quarry of the Pennsylvania-Dixie Cement Corp., Nazareth, Penn.; the Richmond open-pit mine of the Richmond Iron Co., Palmer, Mich.; the Toledo quarry of the Sandusky Cement Co., Toledo, Ohio; the Birmingham quarry of the Alpha Portland Cement Co., Birmingham, Ala.; the Mildred quarry of the Consolidated Cement Corp., Mildred, Kan.; the Spencer quarry of the Mid-West Crushed Stone Co., Spencer, Ind.; the Alpha quarry of the Alpha Portland Cement Co., Jefferson Barracks, Mo.; the Bellevue quarry of the Alpha Portland Cement Co., Easton.

The fact that most mining and quarrying companies are succeeding in their efforts to prevent injuries to employes is demonstrated by the records of the National Safety Competition, the Bureau of Mines points out.

A Criticism of the Standard Cement Tests with Regard to Deciding Strength

By Bertel Geitlin
Chief Chemist, Pargas Kalkbergs Aktiebolag, Pargas, Finland

IN A LECTURE given in the summer of 1927 at the Nordisk Byggnadsdag at Stockholm, I brought forward some views, from which it was evident that the present common methods for examining and judging cement gave results which hardly permitted a correct representation of the real character of the cement, as this expresses itself when using cement in the production of concrete.

As the question of cement standards is in the foreground, a discussion of the subject can perhaps be sure of the interest. Cement standards are nowadays adopted in most civilized countries. On examining and comparing the test rules, one finds that no unanimity has been arrived at, for in certain respects these differ from one another. But if the cement standards in different countries are generally not identical, they agree in the main regarding the method for deciding the most important property of cement, viz., strength.

On condition that no criticism of the time of setting and constant volume can be made, —and in this respect commercial cement fulfills nowadays all established demands— the strength characteristics of cement, such as these assert themselves in concrete, should be the deciding factor when judging the quality of cement.

It is however just these methods for deciding the strength of cement against which the most serious attacks have been directed, and which have been the cause of standard cement tests becoming more and more discredited of late.

Objections to Present Methods of Testing Cement

For a considerable period doubts have been entertained concerning the reliability of the methods of testing at present in force, and voices have been raised for introducing an improvement in this respect. In foreign countries commissioners have been appointed to take the matter in hand, and to propose new rules, according to which cement testing should fulfill its purpose more thoroughly, viz., to characterize the nature of the quality of cement in a fully satisfactory manner.

Time and again the rules for cement standards of different countries have also been subject to alteration. Generally, however, it has been the rule that in agreement with the development of cement technique, only an increase in the severity of the previous requirements has been evolved, while the principle of the method of testing has itself been retained. Although knowing the defectiveness of the method no one has ventured to relinquish it, chiefly for want of anything better to replace it.

If one examines the question thoroughly, he comes to the conclusion that the reasons for the standard cement strength and concrete strength, not always running parallel, are not as yet explained in all details. The method of using cement in ordinary cement testing differs in a noticeable way from the treatment of cement when making concrete, inasmuch as in the former case the degree of consistency is considerably dryer, the degree of ramming is more intensive, and the sand used of a more uniform granular structure. Thus one has cause to find the reasons of the different results with cement under standard testing, and when in practical use in one or more of these particulars.

Water-Cement Ratio of Importance

In the meantime an important factor in this respect has not been taken into consideration, viz., that of water content, which exercises a very great influence on the quality of the concrete. I wish to emphasize in this connection that the degree of moisture of the concrete, and the consistency, have widely different meanings, which on no account are to be associated.

Even if a cement mortar generally corresponds with a comparatively weak degree of consistency, this is nevertheless not always the case, for by regulating the proportions of the mixture, cement, sand, and grading of sand, one is able to produce a cement mortar, which with a greater degree of moisture, has a dryer degree of consistency than another containing less water.

The quantity of water in cement mortar or concrete is most conveniently expressed in its proportion to the quantity of cement present, for according to interesting observations made by Professor Abrams at Chicago, strength with stated materials and workable degree of consistency, is solely and entirely dependent on this so-called water ratio. This was originally expressed by the proportion between the cement and water volumes present in the mixture; nowadays the generally adopted method of stating the weight relation is more exact, for the volume of cement is influenced in no small way by the degree of fineness of grinding and degree of packing.

The connection between the proportion of water and strength can be expressed by a mathematical formula, which with knowledge of the strength with any water proportion chosen at random, enables an approximate calculation of the strength at any other water content to be made. These advantages are not attained by the antiquated method of stating the quantity of water in per cent. of the volume per weight of sand and cement. That the proportion of water must be a deciding factor with regard to the strength of concrete, seems on reflection to be quite natural.

When portland cement is considered in a similar manner to joiners glue as a binding medium whose adhesive powers can only be used by the presence of water, we must take into account the influence of water on cement; a thick glue with low water content gives a higher binding strength than a thin glue with high water content. So far as the strength is concerned, it is quite the same if the material to be bound together is present in larger or smaller quantities, if only the mixture is satiated.

Discrepancies Between Water Ratio in Standard Tests and in Actual Concrete

The important matter for us to know is if any appreciable difference exists with regard to water content, when cement is tested according to standards, and when the same is used in practice.

According to the German rules, in which the method for deciding the strength of cement is followed in the main by the standards of other countries, one uses in preparing the test pieces 1 part by weight of cement, 3 parts by weight so-called normal or standard sand, and so much water that the mixture is brought to a degree of consistency usually called normal consistency, the character of which it has been sought to define exactly. This should be of such character that when the cement mortar is automatically pressed in the molds, water should be expelled between the 90th and 110th blow of the hammer. Experience has shown that this happens with an addition of water of 8 to 9%. The variation of the water needed is necessitated by the difference of the degree of grinding and the chemical character of the cement.

If we operate with a mean water content of 8½%, this corresponds to a proportion of water by weight of 0.34, which

means that to each kilo of cement 0.34 kg. of water is used.

So far as the proportion of water used in concrete technique is concerned it is natural that this varies depending in wide degree upon the kind of concrete construction and the strength required.

We must thus satisfy ourselves by trying to discover the approximate mean water content. If the water in several known and generally used concrete mixtures, given in percentage, is converted, we find, to take an example, that a mixture 1:3:3 with 21% water corresponds to a proportion of water of 0.93 and a mixture 1:6:8 with 15% water to one approaching no less than 1.18, as the cement is tested by standard methods.

When it is further observed that in calculating the proportion of water, that water which enters the concrete with the more or less damp sand must be taken into consideration. This in some cases, such as after rain, or when using specially thin mixtures, such as the manufacture of cement bricks, can be quite considerable. We are able to state with no exaggeration that in the production of concrete really 2 to 4 times more water is used relatively to the cement than when testing according to standard methods.

This difference in the water content seems, as I shall show later, to be the main reason that the result of cement testing cannot be directly applied to the proportion of cement in concrete.

In order to throw light on questions connected with this a series of investigations have been made with two kinds of cement indicated I and II, partly by standard rules, partly with the use of a larger proportion of water.

The results (kg. per sq. cm.) for the various intervals of time are given in Table 1 and the curves of tensile strength are plotted graphically in Fig 1.

The kinds of cement used represent two different types, which in chemical composition within permitted limits show considerable differences. As a consequence of this the curves of tensile strength show considerable variations.

Thus one finds that the normal strength (Series 1) of the cement I is considerably lower with shorter intervals than cement II, but increases quicker with time and after 28 days reaches a value considerably higher than the corresponding figure for cement II.

The standards certainly also demand a test after 7 days' interval, but this has only the character of a test in advance, and is made only to get some idea of the quality of the cement in question, comparatively quickly.

If we in the meantime increase the water content in cement mortar according to the way cement is used in practice, we get a totally different representation of the relative condition of the two kinds of cement.

From Series 2, where the degree of consistency of the cement mortar is designated as wet, it is evident that a comparison with a proportion of water 0.67 results immediately to the advantage of cement II, even after 28 days' interval, and with a proportion of water 0.93 with a degree of consistency of drenched, the difference is still more pronounced.

From this it is evident that while testing cement according to standard methods represents cement I as being of better quality than cement II, this last cement is in fact to be preferred under the conditions in which the concrete is actually produced, and one is compelled to decide that the result of the standard test so far as this case is concerned, was deceiving.

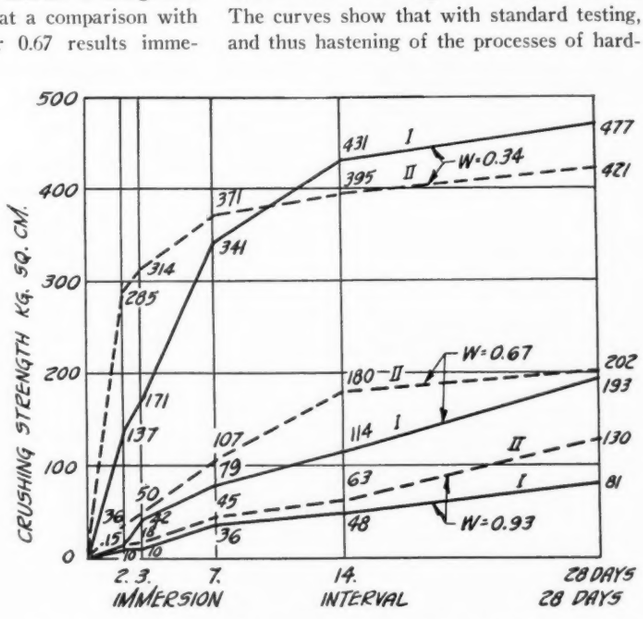


Fig. 1. Effect of various amounts of water on the strengths of two different cements

Why Amount of Water Affects Various Cements Differently

Now it seems to be quite inexplicable why one sort of cement, which with a certain water content has shown a higher strength than another cement under otherwise analagous circumstances, should, within the same interval give a considerably worse result. On examining the matter, however, one finds an explanation which seems convincing.

The addition of an increased quantity of water not only reduces the final maximum strength, but also acts as a deterrent on the binding and hardening processes of the cement, and this takes place to a higher degree the more liberal the addition of water is. A similar period of delay is noticeable with frost or with lower temperature generally.

From what has been shown it is seen that with laboratory tests made with a lower water content in the mortar, and room temperature, the hardening processes are considerably hastened, compared with their course in cement being used for concrete in many locations.

We have already found through our investigations that cement I represents a binding medium which compared with cement II is characterized with a low initial strength, while later hardening was very intensive. The curves show that with standard testing, and thus hastening of the processes of hardening, the two kinds of cement arrive at the same strength after an interval of about 10 days.

In Series 2, with the proportion of water 0.67, these processes take place considerably slower, and the conditions mentioned do not take place before the 29th day.

The trend of the other curves, with an increased water content, show not the least possible inclination to cross each other; nevertheless, there is every reason to suppose that this takes place after a longer interval, may be even of years.

If this is really the case, it would seem that such a very slow later hardening is of little or no importance, for with concrete work, for perfectly clear reasons, the desired and necessary strength must be attained within quite a short period.

On the other hand, using a less proportion of water and the stipulated standard (about 0.34) the curves of strength would certainly cross each other within a shorter interval than 10 days.

Since it has thus been established that standard cement testing must be considered a quick method in which the binding, and above all hardening, processes of the cement are hurried in no small degree, it becomes clear why, when comparing different kinds of cement, the standard strength cannot be taken as a basis for judging the strength of concrete during a corresponding interval.

TABLE 1—RESULTS OF VARYING AMOUNTS OF WATER ON TWO DIFFERENT CEMENTS

Series	Water proportion	Degree of consistency	2 days Cement I	2 days Cement II	3 days Cement I	3 days Cement II	7 days Cement I	7 days Cement II	14 days Cement I	14 days Cement II	28 days Cement I	28 days Cement II
1	0.34	Normal	137	285	171	314	341	395	431	395	477	421
2	0.67	Wet	15	36	42	50	79	180	114	180	193	202
3	0.93	Drenched	10	16	10	18	36	63	48	63	81	130

If a comparison with reference to the last mentioned strength, e. g., after 28 days, is desired, a considerably shorter interval must be used, in agreement with what has already been advocated, if standard strength is to be taken as a basis for forming an opinion.

With the demands of the present time on the quality of cement, it makes practically no difference to the cement consumer how high the value of the 28th day strength reaches; for him it is solely and wholly of importance that the concrete attains the necessary strength in the shortest possible time, so that the removal of the forms and quick continuation of the work is possible.

Recommends 3-Day Standard

Perhaps a certain requisite concrete strength, e. g., after 3 days, could be considered decisive, and this should be compared to a standard strength, according to previous reasoning, of a considerably shorter interval, perhaps one day or only a few hours.

We have thus arrived at the conclusion, that the present cement standards despite all the criticism that they have been exposed to, can give decisive and useful results, if only the present long interval of 28 days be exchanged for a considerably shorter one.

If the quality of the cement in the investigation, Series 1, should be judged, e. g., on the basis of 3 days' interval instead of 28 days, the higher quality of cement II would be emphasised.

Through such a shortening of the interval an important advantage would also be gained, as cement testing could be carried out in a considerably shorter time than previously.

Certain inconveniences would perhaps be combined with such an altered method of testing, and I shall, farther on, return to this matter more closely.

More Water in Test Specimens

I have previously mentioned that when testing cement according to standard methods, and comparing with cement in practical use, a considerable difference is generally found regarding the degree of consistency of the cement mortar and of the concrete mass.

It has thus been natural to seek for the real reasons for standard testing giving uncertain or even incorrect results, just in these circumstances, and proposals for using a more plastic and moist mortar when testing cement have often been advocated.

Extensive trials for clearing up questions combined with this were carried out at the Mechanical Technical Experimental Institute at Charlottenburg, as early as 1902.

The chief result of these experiments showed:

(1) That the influence of a higher water content on the strength of cement is not the same for all kinds of cement, and that,

(2) The reliability when testing with plastic mortar is less than with trials with standard; that is to say, cement mortar of earth dampness.

It seems to be meant here that the variation in tensile strength of the various test pieces is greater in the former case than in the latter. The results stated in the first first paragraph were of such importance that a condemnation of the present method of testing ought to have been a consequence. Apparently the real meaning of this observation was not given sufficient importance, for it, *de facto,* signifies that investigations carried out with a low water content could not be applied to the circumstances which pertain with higher water content. Instead they were led away by details, such as minor disarrangements of isolated tests, and no alterations with regard to standards were made.

The question has been dealt with by the standard commission of Verein Deutscher Portland Cement Fabrikanter, which on the basis of investigations carried out was able to confirm the Charlottenburg results in so far that strength agreement with test cubes of plastic mortar was less than when using a mixture of earth dampness. This circumstance was considered by the standard commission to be sufficient motive for retaining the old method of testing.

We have thus found that when making standard cement tests, the most serious intentions have been shown to go over to the use of a more plastic and moist mortar, in more correct agreement with the practical use of cement, but that these plans for various reasons have been abandoned.

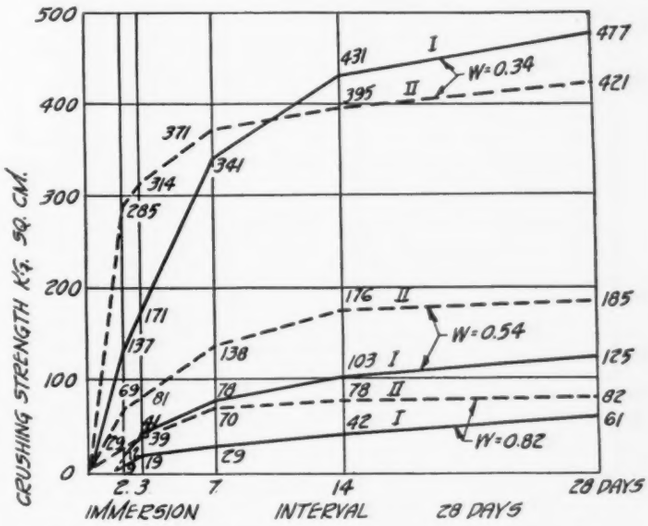


Fig. 2. Series of tests using "normal" consistency but leaner mixtures

It has been ascertained that the automatic and uniform tamping of earth-damp mortar makes a more even result possible, than if the mortar is more plastic, in which latter case a more or less uneven degree of tamping, or mayhap more correctly, degree of packing, influences the strength in an unfavorable manner.

In the meantime it seems that no one has considered the possibility of using a cement mortar which while retaining the degree of consistency of damp earth combines a larger proportion of water.

Possibility of Using Leaner Mixtures

This can take place as is shown in Table 2 by the use of a leaner mixture, for the greater the addition of sand, the more water is needed to attain a given degree of consistency, in this special case, standard consistency. One finds on comparison of say mixtures 1:2 and 1:10, that in this latter case no less than five times more water is needed, relative to the cement, than in the former, to impart earth-damp consistency.

Crushing strength (after 7 days) is also given in Table 2, and it is found how this in accordance with Abrams' law becomes regularly less as the proportion of water rises. On the other hand no obvious relation between strength and water content expressed in per cent. of cement and sand is to be found.

TABLE 2—EFFECTS OF INCREASING SAND AND WATER CONTENT ON TEST SPECIMENS

Mixing proportion, cement : sand	Water in % of cement-sand	Proportion of water to cement	Crushing strength, kg./sq.cm. 7 days interval
1 : 2	8.62	0.26	367
1 : 3	8.25	0.33	228
1 : 5	8.50	0.51	78
1 : 7	10.00	0.80	24
1 : 10	11.75	1.29	7

TABLE 3—TWO CEMENTS PREPARED WITH VARIOUS PROPORTIONS OF MIXING WATER

Series No.	Proportion of water	Mixing proportions cement : sand	2 days Cement I	2 days Cement II	3 days Cement I	3 days Cement II	7 days Cement I	7 days Cement II	14 days Cement I	14 days Cement II	28 days Cement I	28 days Cement II
1	0.34	1 : 3	137	285	171	314	341	371	431	395	477	421
4	0.54	1 : 5	18	69	41	81	78	138	103	176	125	185
5	0.82	1 : 7	9	29	19	39	29	70	42	78	61	82

I shall refer to the results attained when investigating cement samples I and II, previously mentioned, in which an increased proportion of water has been used, while the earth-damp standard consistency, in agreement with what has been mentioned above, has been retained through a simultaneous increase in the addition of sand.

Trials have been carried out partly with a mixture proportion 1:5 (Series 4) partly with 1:7 (Series 5), and the results are given in Table III, and graphically plotted in Fig. 2 For comparison Series I is given.

From these it is found how cement II once more surpasses cement I in respect to strength even after 28 days' interval, as soon as the water proportion rises, and this has even taken place with a constant degree of earth-damp consistency.

By these means it has been completely demonstrated that the reasons for the uncertain or incorrect results of the standard cement tests have not been found, as has been more than presumed, in deviations in plasticity, or degree of tamping, from the usual methods in using cement, but in the different proportions of water, which for that matter is in full agreement with Abrams' law.

Recommendations for Changing Standard Test Methods

On the basis of what has been put forward above, we come to the conclusion that two different ways can lead to an improvement of the clauses of cement test standards for deciding strength.

On the one side the present method of testing could be retained, if only when using, the greatest importance be laid on results after short intervals (1 to 3 days); on the other side, in greater agreement with the method of using cement in practice, a higher water proportion could be used, in which case the earth-damp degree of consistency and the uniform automatic tamping could be retained unaltered, if only the mixing proportions of sand be increased in a corresponding degree. The method first mentioned has without doubt certain advantages. The test pieces could be made in the same way as previously by which means a very large number of curves of strength of different sorts of cement which exist could serve as a guide when fixing minimum strength, after a certain interval. This method is, however, as a quick method, also combined with certain weaknesses.

As the crushing strength after 2 to 3 days' interval continues to rise a considerable amount in a small interval of time (hours or even minutes) one would be compelled in order to attain exact results to note very carefully the time each test piece was made and take this into consideration at the time of crushing; which would make the tests more difficult and complicated, as it is customary to make a large number of test pieces and crush them approximately at the same time, i. e., approximately the same time.

Another circumstance of still greater importance is the way in which the water content in the cement mortar is fixed. As has already been mentioned, the quantity of water must be so regulated that when tamping takes place water is expelled between the 90th and 110th blow of the hammer. According to experience this clause gives rather varying or arbitrary results.

Thus one person considers that the normal consistency is attained with, e. g., 8½% of water, which compares with a proportion of water of 0.34 while another considers ¼% more or less is needed. This apparently unimportant difference in the water content is however sufficient to cause considerable differences in the tensile strength.

Different Results from Different Laboratories

I can mention in connection with this matter that a small quantity of cement was intensively mixed and divided into five parts. These were packed in hermetically sealed vessels and sent to various material testing establishments, not only at home but also abroad. The certified results for crushing strength varied for a 3 days' interval between 201 and 300 kg. per sq. cm.; for 7 days between 351 and 444 and for 28 days' interval, between 438 and 534 kg. sq. cm.

In order to avoid such large variations, which make the present methods of cement testing illusory, it is necessary to fix the water contents more distinctly, by which means similar individual influences would be eliminated. Instead of trying to attain the desired normal consistency in the cement mortar by regulating the quantity of water, as at present, the matter should be approached in another way.

As small variations in the water content cause large differences of strength, the proportion of water should be carefully fixed, because the normal consistency is regulated by the mixing proportion, cement: sand, which proportion even if it does vary individually, according to Abrams' law has no influence whatever on strength.

If therefore it should be stipulated once and for all in the rules, that the proportion of water should be, e. g., 0.35, cement tests would then take place as follows:

For each kilo of cement used for preparing the test pieces the same exact quantity of water, viz., 350 gm., would always be used, and so much sand be added that the normal consistency is attained. As we know this takes place approximately with a mixing proportion 1:3.

Small differences could depend on differences in the cement with regard to grinding or chemical composition, or individual outside influences, but the final result is as already shown independent of these.

If we wish to make use of the other recourse which is open to us, viz., the use of a considerably larger water percentage when testing cement—a course which is decidedly to be recommended, for by this means we attain nearer to the proportions which exist in the practical use of cement—the question arises what proportion of water should be chosen in this case?

It has already been found that in reality 2 to 4 times more water is used relatively to cement than with standard tests. By way of proposal, double the quantity of water could be considered as suitable, which would thus correspond to a proportion of water of 0.70. In this case the sand would also, as just mentioned, be added in such quantity that normal consistency would be attained.

The deciding "interval" for judging the cement could be fixed to seven days, while the required minimum crushing force ought to be fixed after a large number of different kinds of cement have been examined according to this method. Probably 40 to 50 kg. per sq. cm. would be considered suitable.

Before I conclude I wish in advance to meet a criticism which possibly will be made on account of the deduction from the evidence I have put forward concerning the reasons for the unsatisfactory results of the present cement standards. On the one side I have compared the results of standard tests, on the other the results of the examination obtained when using test pieces made of cement mortar with a larger proportion of water. These last mentioned results I have applied directly to the circumstances pertaining when using cement for the production of concrete. It may possibly be remarked that such a comparison of cement mortar and concrete cubes made in the laboratory is not correct.

In this a certain amount of truth may lie, but in any case only a truth in moderation. As is known, one understands by cement mortar a mixture of cement, sand and water, while the mixture is known as concrete as soon as a coarser aggregate material, pebbles or crushed stone, is added. The fixed limit between sand and pebbles varies in different countries, but amounts usually to 5 to 7 mm. This limit value is, however, arbitrarily chosen, and on good grounds any other size could be chosen.

There is therefore no reason at all to suppose that the way in which the strength characteristics of cement express themselves in any certain way is influenced by the coarser stone materials' presence or absence.

We could on this ground with a certainty bounding on probability consider that the main reason for the uncertain results of cement testing are to be found in the abnormally low water content used in the cement mortar.

Since Pargas Kalkberg A. B. has taken steps to install a modern 200-ton press for crushing concrete cubes, these investigations will be completed and consummated through the use of concrete bodies instead of such made of cement mortar.

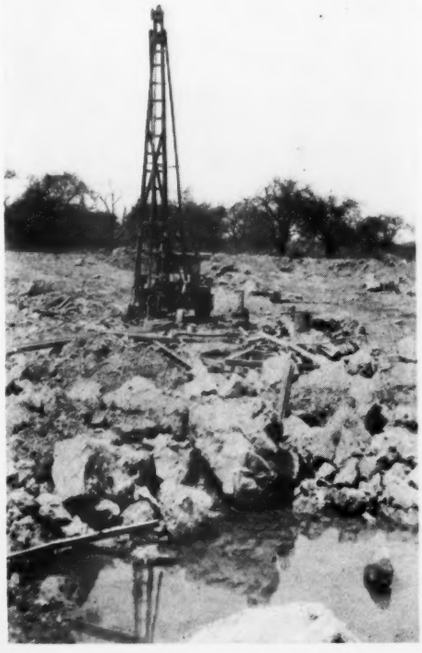
The Present Activities of John H. Odenbach

Eastern Crushed-Stone Producers Have Found It Pays to Watch His Developments

WHEN a man can design, construct and operate a plant that produces upwards of 3000 tons of crushed dolomite per day, using a total of 17 men, not including the men required to operate the company's trucks, and a total power consumption (motor rated) of less than 400 hp., it should be sufficient evidence that his operations are watched with interest. So crushed-stone producers in New York state have found it pays to visit John H. Odenbach and his Dolomite Products Co. plant at least once a year.

His plant at the western edge of Rochester (described in ROCK PRODUCTS, August 6, 1927) is really one of the most remarkable operations to be found in the United States, and is unique in that practically all of the screening and sizing is accomplished by roll-type grizzlies. Some said that an aggregate that would meet specifications could not be produced on this type of equipment, but Mr. Odenbach is doing it, and when one watches the crushed stone rushing and cataracting over these grizzlies, he is reminded of water flowing over a sandy bed and disappearing, the operation is so quietly and efficiently accomplished. The roll grizzlies, even after two years of use, show very little signs of wear.

Installing the conveyors at the new Pennfield plant

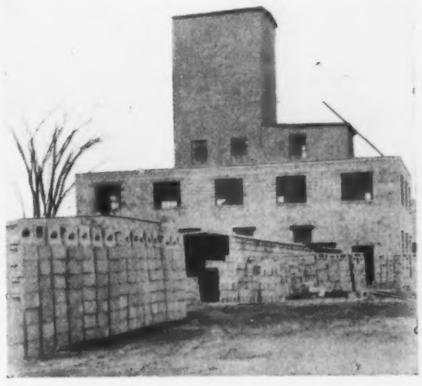


Opening up a new quarry for the Pennfield plant

Recently Mr. Odenbach installed two Niagara vibrating screens in addition to the roll grizzlies, that act as cleaners for the smaller sized stone. Previously to installing this equipment the fines had some oversize, which was not only undesirable from an economic standpoint, as the fines were stockpiled and not as readily disposed of as the larger aggregates, but made the product in a measure undesirable for manufacturing into concrete tile products.

Products Plant to Utilize Waste Screenings

In carrying out the program of disposing of his fines, Mr. Odenbach is entering the concrete products manufacturing business and has the buildings completed that will house this new enterprise. At present he is feeling his way along with a small production unit consisting of a ½-yd. mixer and hand molds, but very shortly the machinery for the completed plant will be installed, and it is a safe gamble that there will be original innovations in that particular plant that will make cement products manufacturers sit up and take notice just as he has made crushed-stone producers do.



Concrete products plant built to utilize the fines after recovering

The Pennfield plant under construction in the east end of Rochester

Soon after Mr. Odenbach built this plant he replaced the secondary crushing unit with a 5-ft. Symons cone crusher, and its performance on dolomite is one of the remarkable features of the plant. The minus 6- to 8-in. stone from the primary crusher is fed to this crusher by an opening in the side of the bin, but no matter how fast the

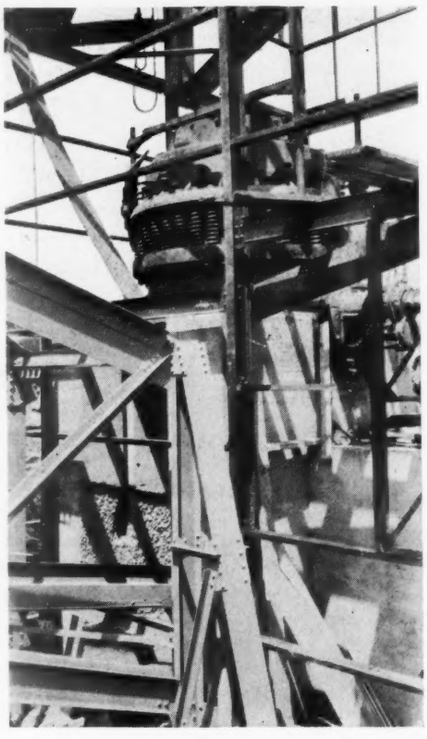
A recent shot at the Dolomite quarry. Some of the flat slabs were polished and used in John Odenbach's new home and other structures he has built

stone floods out of the bin into the crusher, it literally eats its way out. Incidentally, up near the office lies a broken spindle of a 42-in. gyratory crusher, caused by a shovel part getting into the crusher, but a few days before the plant was visited a shovel tooth got into the Symons cone crusher (and Harvey Clark, superintendent, is authority for the statement that one more lick and it would have passed on through), with no damage done to the crusher, although the shovel tooth took quite a licking.

Rescreening Fines for Oversize

A previous reference was made to the stock pile of fines accumulated from prior operations. These fines contain a considerable amount of oversize in them, so Mr. Odenbach has designed and has been experimenting with a small portable screening plant consisting of a frame hopper that will feed a Niagara vibrating screen, the whole structure being mounted on four wheels so as to be readily moved around the storage yard. The oversize will be sold for commercial dolomite, and the fines used for production of concrete dolomite tile and dolomite brick.

A large part of the dolomite sold by this company is trucked into Rochester by trucks that are owned by the Dolomite Products Co. The company owns a total of 47 trucks, 30 Macks and 17 White. Four of these trucks with specially built bodies are being used for transporting stone from quarry to the crushers, and 13 are allotted to the new plant now under construction on the east side of the city of Rochester.



Placing the new cone crusher at the Pennfield plant

Stock piles and track yard. The main sizing plant (Gates) shows in the background

Retailing as Well as Using Gasoline

These trucks, use, under normal conditions, about a carload of gasoline per week, or, roughly, 50,000 gal. Most operations would either purchase gasoline from service stations or dole it out from almost any kind of a pump at the plant, but not so at Mr. Odenbach's. For the primary purpose of serving his own trucks he has built a model gasoline and service station on a corner of his property that abuts one of Rochester's arterial highways and will retail not ordinary gasoline but "Dolomite" gas to passing motorists. Mr. Odenbach says he has to keep a man, anyway, to service his own fleet of trucks, so he shows again his versatility in entering this rather unusual side line for a crushed-stone operation.

The new service station is built entirely of dolomite products and steel, with the floors in the rest rooms, main supply room and porches of polished slabs of dolomite taken from the surface of his deposit. These slabs are all deeply etched or scratched from glacial sources of distant geological times. The roadways and approaches are wide and will be flanked by garden and flowered borders. An unsightly pond adjacent to the site is to be made into an attractive little lake

Field screening plant by which marketable stone is recovered from the waste fines

with a water fountain and aquatic plants, the lake to be the center of a small and attractive park. We don't know if this little park is to be named, but if it is, it's a safe bet it will be Dolomite Park.

New Plant Under Construction

Recently Mr. Odenbach purchased outright the plant and holdings of the old Ripton Crushed Stone Co., which operated about three miles east of Rochester, and the company which Mr. Odenbach heads will continue to operate this quarry until his new plant, which is approximately one-half mile west of the Ripton plant, is ready to operate. At that time the Ripton quarry will be closed.

Mr. Odenbach entered the crushed dolomite business about eight years ago, and the first year's production was very modest, less than 10,000 tons. His production from the west side plant will now average 400,000 tone per year, and to further assure the citizens of Rochester that they will be amply supplied with crushed dolomite in future years, Mr. Odenbach has now under construction a second crushing and screening plant on the east side of Rochester, to be known as the Pennfield plant. This plant will be almost exactly a duplicate of the west side plant, more properly known as the Gates plant, and Mr. Odenbach says it will be the last word in production efficiency, economy of operation and beauty of architecture. Mr. Odenbach plans on landscaping the yard surrounding this plant, and when he says he will landscape and beautify a crushed-stone plant it is safe to place another bet that it will be one of the show places of Rochester and of the entire crushed stone industry, with its yard, dolomite walkways, dolomite lawn vases and, perhaps, a few rare species of Rosa Dolomitia. You can rely on John Odenbach to combine beauty with utility.

John Odenbach's artistic service station at which the company's trucks are serviced and "Dolomite" gasoline retailed

Beryl Possibilities in New Hampshire

By H. N. Kirk
H. N. Kirk and Co., Keene, N. H.

AS THE TENDENCY today is to refine ores at the source of the ore or nearest power available, it makes Cold River, N. H., or Bellows Falls, Vt., both located on the railroad, logical locations for a new industry that is now in the process of a pioneer effort of producing beryllium and its alloys from beryl crystals.

About nine miles from these points is located Beryl Mountain in South Acworth, N. H. Here is to be found pockets of large beryls, some over a foot across. As the ratio between the diameter of a beryl crystal and its length varies from one to ten or one to twenty or more, some of these crystals must be over 20 or 30 ft. in length possibly. Without doubt this mountain has the largest limited supply of large beryls known.

Cheap hydro-electric power is avaible at Bellows Falls and a still greater power station is being built in the northern part of the state which could furnish cheap power for this new industry which is now on its way toward perfection.

Beryllium has been produced closer to a commercial scale in the laboratory than it ever has before. Just how long before this industry will become an actuality is a question, but it is said to be only a few years. In view of the fact that beryl is associated with mica and feldspar, to mine it at the lowest possible cost it will be necessary to keep all mica and feldspar mines that are now in operation at full capacity and open up new prospects that will eventually develop into mines.

This cannot be brought about unless the United States Government furnishes a much higher duty on imports of mica and feldspar. So far as known today the supply of beryl is very limited, so every effort should be made to foster these two industries and to increase them in number so that the supply of beryl may be thus increased. By so doing it will place the United States in an independent position in case of war as regards mica. So far as one can foresee the amount of beryllium or beryllium alloys produced will be limited owing to the limited amount of beryl crystals obtainable.

Beryllium is a metal one-third lighter than aluminum. It has been known for many years to exist. Now, we have two concerns, one in Germany and one in the United States that agree that it can be produced on a commercial scale, but the price will be high, just as aluminum was when it was in its pioneer stage of development; approximately $240 per lb. It is expected that beryllium will pass through about the same stages of development to a limited degree as aluminum has, but it probably always will be a high-priced metal, as the ore supply is more or less limited. In fact, as compared with aluminum, its source of supply is very limited.

Beryllium alloys, it is claimed, will find many important uses in the aeroplane industry where lightness and strength are desirable.

Nonmetallic Uses

Beryl also has nonmetallic uses such as an ingredient in high tension insulators of high class; secondly, as an ingredient in glass that allows transmission of ultraviolet rays. Beryl also is much sought after in sound crystals of good color for the manufacture of idols by the Chinese. Gem beryls are rare and expert judgment is needed to make known their value.

The demand for beryl is predicted to be far beyond the supply in the future. The great bulk of all beryl in the United States is said to be of commercial quality.

Calling the attention of all feldspar and mica mine owners to the value of beryl now, and its predicted value, may start them into saving every crystal which eventually will be worth the trouble.

I hope the above facts will have some influence toward giving mica and feldspar a higher duty on imports of mica and feldspar. If this is done it will increase by some hundreds the labor that is employed in these industries in the United States.

Beryllium has been a drone metal for many years, but it looks now as if the Beryllium Corporation of America will make the pioneer effort to take this metal out of that class.

Spain Lowers Cement Duties to Defeat Trust

THE SPANISH GOVERNMENT has lowered the duties on foreign cement for use in construction of public works of the states, provinces and communities due to the fact that when the 5,000,000,000 peseta building program was announced, domestic cement firms formed a trust to dictate prices, being supported by a law which forbids contractors to use foreign cement for public works.

Diesel Engines in the Rock Products Industries

Part II—Stone and Gravel Crushing Plants

By Orville Adams

POWER COST in the rock products industries is receiving a great deal of attention. During the last few years, an adequate and important share of the great amount of research work now being done has been directed toward the question of power cost, with the result that the industry has benefited to a considerable extent. One of the chief factors has been aggressive competition. On the other hand, scientific progress claims an equal share of the credit, while the rapidly changing economic significance of labor cost, return on investment and unusual growth of the industry has perhaps had an equal influence in stimulating closer study and better engineering all along the line.

It is an interesting story of progress and achievement in an industry so widespread and diversified that no two operations are exactly alike. Yet many fundamentals have been found to be universal. As in most other basic industries, the price of progress is the ever-present necessity for more and more economical production.

Keen and alert competition has forced one improvement after another toward that end, with devices for eliminating lost motion, labor-saving methods, doing more with machinery and less with man labor. As a result, with each improvement, and advancement in design, more power seems to be used, more mechanical power. Obviously the power question has grown more and more important. On the other hand, increasingly higher standards demanded by the engineers for aggregates calls for a higher developed and more complicated process both in the crushed-stone and gravel plants. This again means more power. As long as an industry uses labor or man power in large quantities, little or nothing can be done to reduce that cost per unit, but with machinery, and generated power to take the place of labor, quite another story is found.

Definite and important research work has been done and authoritative investigations have been made on this question of power costs. A particular case in point was a paper by Dr. George E. Ladd, of the U. S. Bureau of Public Roads, read before the National Crushed Stone Association convention at West Baden, Ind., in 1928 (see ROCK PRODUCTS, January 21, 1928). This paper, among other things, covered important comparisons of power cost analysis.

His survey extended over a period of several years and comprises the results of his study of 23 quarries. Operating cost of production as a whole, as well as relative power cost per unit of production, was carefully analyzed. Under four typical conditions he found in plants having a daily capacity of 2000 tons a production cost of $0.42, $0.34, $0.31 and $0.28 per ton respectively, or approximately an average of $0.34 per ton (operating costs only, no overhead, etc., being included).

In view of this average operating cost of

TABLE I—COMPARISON OF OIL ENGINE POWER, STEAM AND PURCHASED POWER (ELECTRIC)

COMPARISON - OIL ENGINE PURCHASED POWER AND STEAM

DIESEL FUEL OIL — RATE OF CONSUMPTION LBS. PER BHP. PER HOUR	FUEL COST PER BRAKE HORSE POWER HOUR 300 DAYS ~ 10 HRS. PER DAY					FUEL COST PER BRAKE HORSE POWER HOUR 300 DAYS ~ 24 HRS. PER DAY			
BUILDERS GUARANTEE	$0.04 COST	$0.05 COST	$0.06 COST	$0.07 COST	$0.08 COST	$0.05 COST	$0.06 COST	$0.07 COST	$0.08 COST
.40	6.45	7.40	9.68	11.29	12.90	19.35	23.22	27.00	30.96
.42	6.75	8.45	10.14	11.83	13.52	20.25	24.30	28.35	32.00
.45	7.20	9.00	10.80	12.60	14.40	21.60	25.92	30.24	34.56
MOTOR-ELECTRICITY	PRICE OF CURRENT PER K.W.H.					PRICE OF CURRENT PER K.W.H.			
EFFICIENCY OF MOTOR — KILOWATTS PER H.P. PER HOUR	$0.01 COST	$0.02 COST	$0.03 COST	$0.04 COST	$0.05 COST	$0.01 COST	$0.02 COST	$0.03 COST	$0.04 COST
.80 — .932	27.96	55.92	83.88	111.80	139.80	67.10	134.20	201.30	268.40
.85 — .878	26.34	52.58	78.02	105.30	131.70	63.20	126.40	189.60	252.90
.90 — .829	24.87	49.74	74.51	99.48	124.00	59.61	119.40	178.10	238.80
STEAM-COAL FUEL	PRICE OF COAL PER TON					PRICE OF COAL PER TON			
LBS. OF COAL PER H.P HOUR	$4.00 COST	$5.00 COST	$3.00 COST	$7.00 COST		$4.00 COST	$5.00 COST	$6.00 COST	$7.00 COST
2	12.00	15.00	18.00	21.00		28.80	36.00	43.00	50.40
3	18.00	22.50	27.00	31.50		43.20	54.00	64.80	75.60
4	24.00	30.00	36.00	42.00		57.60	72.00	86.40	100.80
5	30.00	37.50	45.00	52.50		72.00	90.00	108.00	126.00

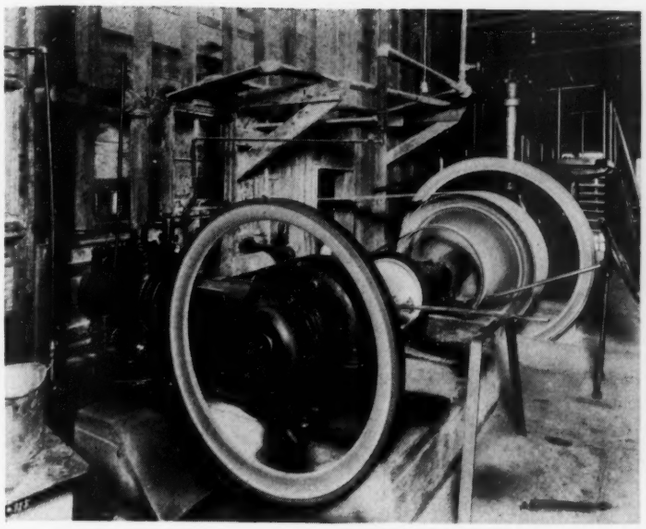


Fig. 1. Engine room layout at the Byers Crushed Rock Co., Kansas City, Mo.

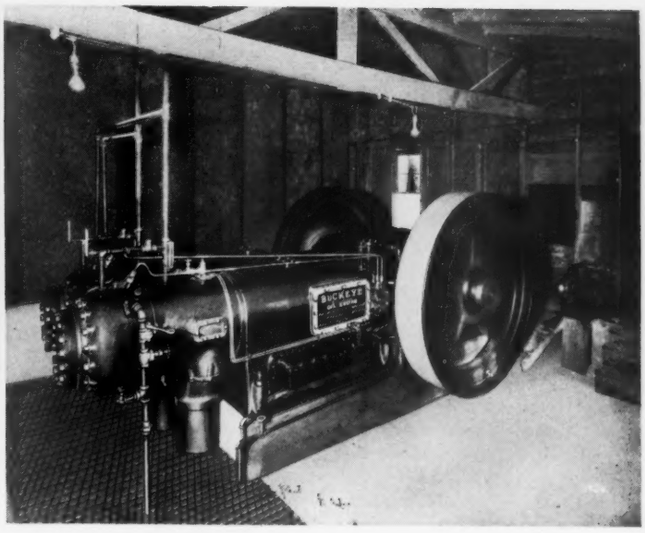


Fig. 5. The 260-hp. Diesel which is the power source of a 1000 ton per day crushing plant

production per ton, it is quite significant to find what part of this cost was for power. We quote from his paper as follows:

"In regard to the savings with steam and electricity, two plants owned and operated by the same company and in the same kind of rock used for crushing and screening plants, steam and electricity respectively. In the steam-operated plant, crushing and screening costs were $0.1015 per ton of product, and the plant where electricity was used the cost per ton was $0.0630. Here was a difference of nearly 4 c. a ton in cost. The savings at the electrically operated plant amounted, in round numbers, to $23,000 per year. Of course, ultimate costs per ton as between these two methods depends upon fuel cost and the cost per unit of electric power.

In the instance cited above, it should be noted that in case of the steam plant, power cost is practically equal to one-third of the total direct or operating cost of production, whereas with electric current, the power cost is about one-fifth of the total operating cost.

Oil Engine Power Costs

In view of the fact that power costs seem to be a great part of the total operating cost for producing stone, it would be profitable to find how much difference may be made with the use of Diesel engine power. A great many rock-crushing plants have installed Diesel engines and kept records. In a number of typical cases it has been observed that there can be as much difference between purchased power and oil-engine power as between the purchased power and steam, as found by Dr. Ladd. When the operating cost can be reduced as much as 33⅓%, in other words, power obtained for around 1c. per ton of rock crushed and screened, the economy of the Diesel engine may be appreciated. That operators are turning rapidly to this form of power wherever feasible, is but a natural result.

A Typical Case of Diesel Power

A Kansas City plant, the Byers Crushed Rock Co. began using Diesel power about two years ago. This firm crushes and elevates rock for 1⅓c. per cu. yd. The plant formerly used purchased power, and the present cost for operating the entire plant with the Diesel engine is less than it formerly cost to operate the compressor alone with purchased electric current.

When using purchased power, the cost per cubic yard of rock was definitely established at 7c., and the records of the Diesel power cost show that this has been reduced to 1⅓c. This plant is four miles from the railroad and the fuel oil cost them 6c. delivered. Louis Marino, a partner in the business, is the authority for the following statement:

"Regarding the cost of operating our Fairbanks-Morse 180-hp. Diesel engine, we give below the operating figures for the month of July, 1927.

"Rock crushed	6714 cu. yd.
Fuel consumed	1200 gal.
Lubricating oil	40 gal.

"Our engine has been in operation 15 months and during that period there have been no major repairs necessary, our total repair bill being $0.82. The writer operates the engine himself with his other duties consisting of superintendence of blasting, care of jackhammers, excavation and other duties necessary to the operation of the plant.

"The engine not only furnishes power to the crusher which consists of a 7½ K Gates and a 36-in. Symon disc and a 10 x 11-in. Sullivan air compressor, but also an 84-ft. elevator using 24-in. buckets and one 24 x 48-in. screen.

"Our crusher has never been down for repair, in fact we consider the Diesel engine more dependable than the electric current which we formerly operated with. Our records show that it cost us more to operate

Fig. 2. Byers Crushed Rock Co. plant—notable example of a Diesel operated plant

our air compressor alone on purchased current than it now costs to operate the entire plant."

The engine-room layout and the plant is illustrated in Figs. 1 and 2, which show the air compressor direct-connected to the engine stub-shaft with an intervening pulley for driving the crusher and elevator and screens. A small generator is also used, eliminating any need for purchased electric power whatever, furnishing lights for the plant, being a 32-volt machine with storage batteries for use when the engine isn't running.

Further evidence of good Diesel-engine practice is use of a Mid-West air filter to insure clean air for the engine and protect it against the dust present around such plants. The engine is also amply protected from scale by the use of a closed cooling system. The cooling water is pumped through a series of coils and cooled by raw water from the creek.

It is not unusual for plants of this size to make a savings of from $10,000 to $15,000 a year with the oil engines. In nearly all kinds of enterprises, the Diesel engine is responsible for more profitable business, and is gaining ground quite rapidly, not only for reasons of economy, but, reliability, and a reduction in space, labor and adaptability.

Another case where a Diesel engine replaced purchased power which had been given a full and complete trial is shown in Fig. 3. This is a 500-hp. Fulton Diesel installed in 1926. The savings has been sufficient to replace the investment in less than five years. An investment of between $40,000 and $45,000 would not have been made unless the chances for materially reducing the cost had been good, or the necessity for cheaper power appreciated. The "Dieselization" has been amply justified in the last two years, according to the reports from this operation. This case is typical of many other similar ones where the owners have really gone into the power problem with the idea of securing better economy.

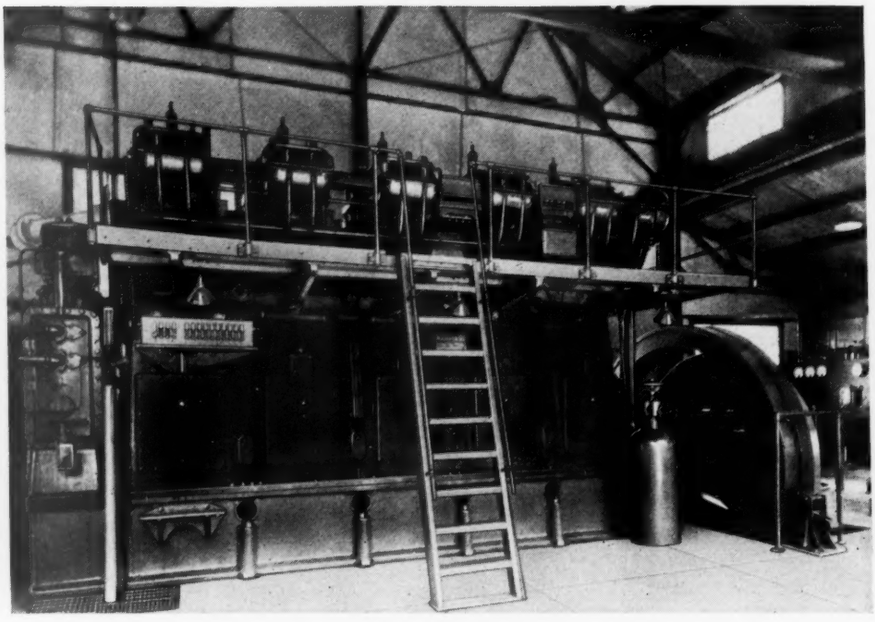
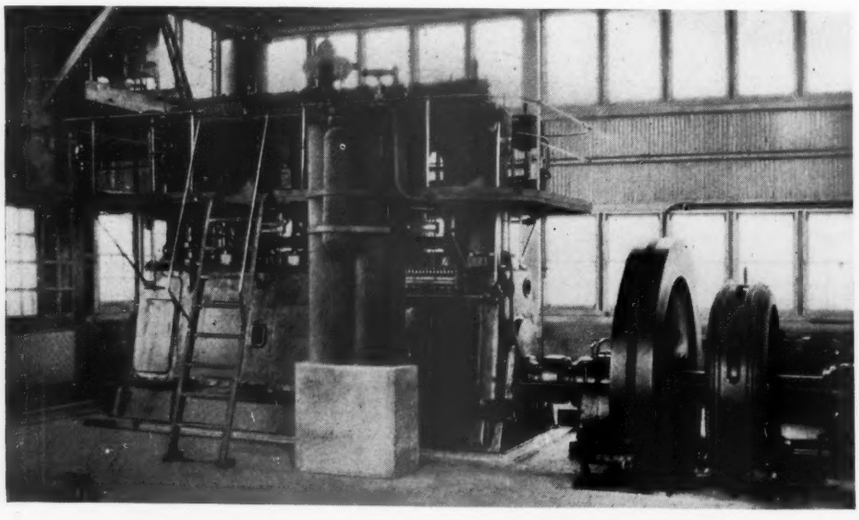


Fig. 3. The 500-hp. Diesel engine installed at the Limestone Products Corp., Newton, N. J., to replace purchased power

Another quarry plant in Kansas operating a Diesel engine for several years is the Solvay Process Co., at Moline, which has a 400-hp. McIntosh and Seymour Diesel. Despite the varying load of the quarry operation, it is found that the engine has good economy at all loads. Other advantages are the elimination of the boiler-room labor, which can be employed in production work.

Unlike the steam plant a Diesel plant is a self-contained power plant and can be moved to a new location with very little loss in value and expense. This is an added value in the rock products industry where the capital assets are continually depleted and there is a day coming when all the readily available rock will be taken out, and it will be necessary to start operations elsewhere. In a great many enterprises this simply cannot be overlooked by the investor and owner of rock plants.



A 400-hp. Diesel furnishing power for the quarry operations of the Solvay Process Co., Moline, Kans.

Replacing Steam Power

There are many well-known plants in many parts of the country that would have been out of business today, if the operation had continued the use of steam. A plant with a 250-ton capacity located at Webster Groves, Mo., finding operating costs high with steam and facing keen competition installed a St. Marys oil engine after thoroughly investigating purchased power. Even though this plant is located right in a section where hydro-electric power is available, estimates on rates showed that the demand charges, construction of necessary lead-in equipment and the like would be very little lower than the steam cost had been, and there was no direction to turn toward except the Diesel engine. The Diesel could run only when needed, could be started instantly when power was required, and there was no standby charge. This installation has practically paid for itself in a couple of years. From now on the cost for power is a small item. This type and size of plant, is typical of many of those that make use of oil engines and is illustrated herewith on the following page.

A Kentucky plant, the Cerculean Stone Co., a ballast plant on the Illinois Central Railroad had used steam since its beginning. Some years ago this plant installed a 200-hp. oil engine and the fuel and oil costs for several seasons averaged less than 0.006c. per ton of crushed stone. The savings amounted to an average of $12,000 a year, or paid for the engine in 18 months. As the engine paid for itself out of savings, it is

not considered an investment, yet taken as such, it earns a return of better than 50% per year.

Reliability vs. Unreliable Purchased Power

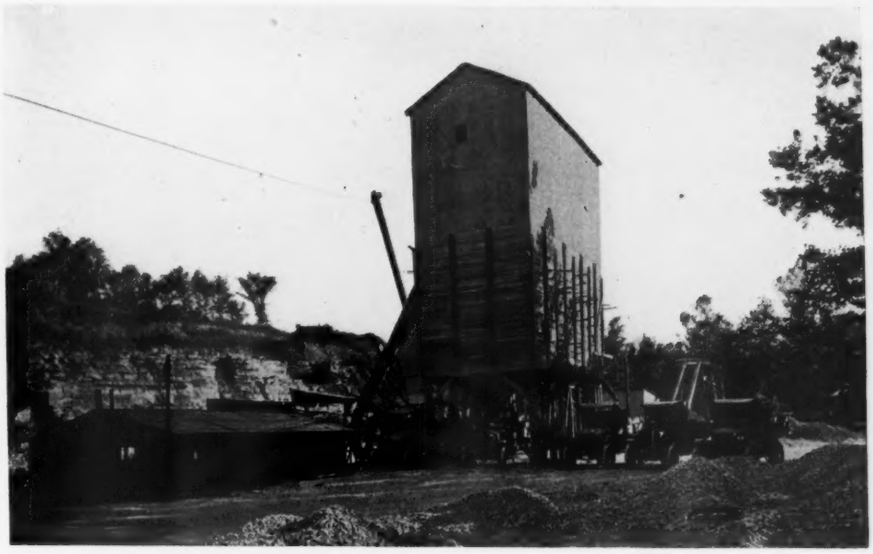
Instances where the question of reliability has been an equally strong governing factor in favor of the oil engine are abundant. Aside from economy, reliable and dependable power is highly desirable for a crushing plant. Reliability of the Diesel is unquestioned by experience where proper regard and fair caution in the matter of cooling, lubrication and adjustment is taken. Many plants operating 24 hours a day over a period of years bear out this conclusion. With the proper attention to a few simple matters in plants operating 10 to 12 hours a day, there is no excuse for a shutdown as far as the average oil engine is concerned, particularly when there is ample time daily to check the operating condition, and sufficient opportunity for the yearly overhaul.

With electric power, however, there is in many parts of the country an entirely different story to tell. A very serious and unsatisfactory condition due to electric current outages has been observed. An observation recently made in one of the important production zones and a section completely tied up with interconnected power will be remembered by readers of Rock Products. On a recent editorial trip made by one of the editors of Rock Products, reporting on the "Quarry Industries on the Mississippi Below St. Louis" the seriousness of electric current interruptions in this highly developed electrified territory was observed, and in commenting upon this the editor said:

"One thing very noticeable at the crushstone plants using purchased electric power was the uncertainty of power delivery. At four different quarries visited over a period of a week, the power was off at each of the above plants, while I was there for periods of from a few minutes to several hours. This is very poor service to say the least of it, and does not compare with service on the Pacific coast, where the writer operated several years, and where if electric current failed four times a year, it would be considered unusually high.

"Where a stone quarry has several crushers, the initial unit having at times as high as 20 tons of large size stone dumped into it, one can see what a serious matter it is to have the power off, even for a few minutes, for most of the rock has to be removed by hand before the crusher can start. These interruptions are invariably without any previous notice. At one plant they were all set to make a record production when about 11:30 A. M., the power failed and was off about two hours. This loss in production is a serious matter to the operators in the district during their busy season, and the electric power companies should be impressed with the necessity of uniform, steady power delivery, if they expect to find further sale for their power in the rock industry."

In his last sentence we find the major reason for the selection of the Diesel engine in many parts of the country. The two or three months of the stormy period of the year in the Southern States and along the Mississippi River are practically concurrent with the production season. During this period an outage a day is observed in a number of sections that are supposed to be highly interconnected. What remedy therefore, for this condition can be expected?



The Grant Road quarry at Webster Groves, Mo.—a 250 ton per day Diesel operated plant

Another view of the Grant Road quarry showing a section of the quarry

The Diesel engine at the Grant Road quarry

The Diesel engine will continue to be the surest and best answer in these sections beset with storms and where production time is at a high premium, which would seem to be the case for sometime to come. In these sections the Diesel has established its reliability without question, a factor influencing its choice more and more.

Another stone plant formerly using steam where the oil engine was selected because of the necessity for reliable power is illustrated in Fig. 5. This is a 260-hp. Buckeye oil engine and operates on a fuel consumption of 9.7 gal. per hour, with a production of 1000 to 1200 tons per day. This engine pulls Nos. 8, 5 and 3 Gates gyratory crushers and a 60 in. by 20-ft. screen. The engine is operating about 12 hours a day 25 to 30 days a month, and showing very fine economy. It will be noted that the engine is housed in a room having very little headroom and space, and the drive is from a belt on the flywheel, further reducing the space for the engine. It is usually very easy to find sufficient room around the plant for the installation of an oil engine.

Many of the best cases observed are plants where purchased power has been tried. In these cases the original electric motor drives were retained and a Diesel electric power plant installed, the operation remaining the same. On the other hand many plants recently have been motorized with the intention later on of installing a Diesel generating plant, using purchased power only until such a time as the business would justify the additional investment for the Diesels.

Analyzing the Diesel Power

The story of the Diesel in the rock products industries would not be complete without a discussion of some of the engineering considerations involved in the application of the engines in this service. It would therefore be interesting to look into the general practice of engineering the Diesel plant in this work and show how exact studies and facts are arrived at with little or no hazard or guess work. The following considerations charts, figures and estimates are fairly accurate and a summary of necessary factors involved when considering Diesel power in comparison with other prime movers and purchased current.

(1) Power Requirements—While it is necessary that ample power be provided, many operations with Diesels require no standby capacity, and unless the operation is very large and extraordinary need for day and night operation is involved, standby capacity is not considered necessary.

(*a*) *Nature of the service*—Most quarries have a heavy varying load, and when using purchased power are notoriously lacking in good power factor, for which they are often penalized by the electric companies one way or the other in the form of a straight charge or an arrangement of a complicated demand schedule. On the other hand the Diesel is specially adapted to such conditions because it has practically as good economy while the load is light and variable as on full load. It is also well known that the fuel consumption per indicated horsepower at light loads is really better than at full load, so as to nearly balance the effect of lower mechanical efficiency at lighter loads, and hence gives a fuel consumption per brake horsepower that is substantially uniform at the various loads at which it operates in crusher operation.

(*b*) *Estimation of power requirements.* It is also very necessary to check accurately the load condition at all times, and arrive at a daily load curve, and ascertain peaks and amount of variation. Seasonal changes and modifications in the operating process are necessary. This information should then be compared with the horsepower ratings of all the machines in operation. Steam indicator cards on steam engines and electric motor readings, for motor-driven plants, together with power factor studies should be made.

(2) Proper Application to Meet Load Conditions—When the above information has been obtained, the application of oil engines to the average service should not prove either a difficult engineering problem or comprise any difficulty of a practical nature. The important points are these:

(*a*) The size and number of units necessary to determine the most economical operation to suit load conditions, and to secure as good factor as possible is the first important consideration. Where there is more than one complete process not necessarily operating at the same time, more than one unit will possibly be advisable. A case in

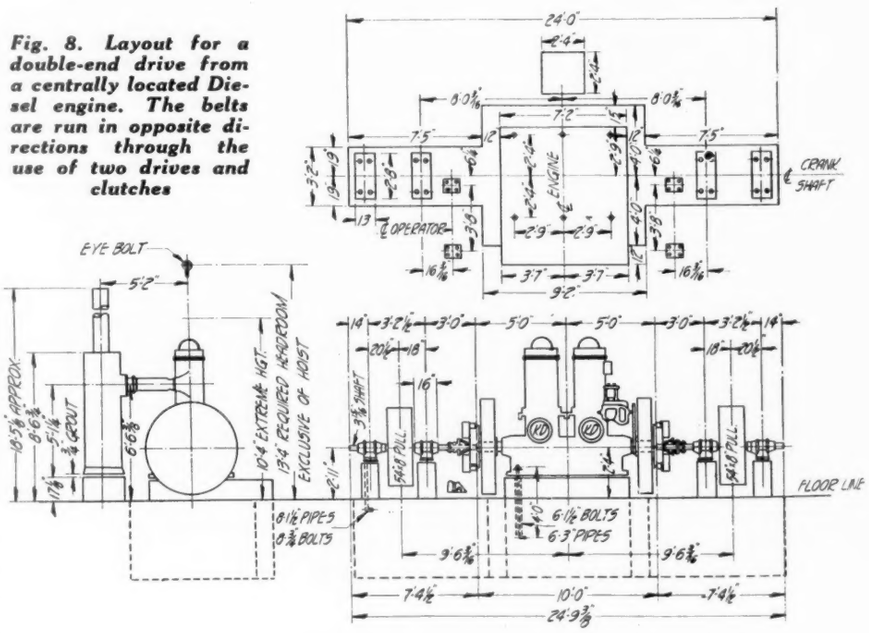


Fig. 8. Layout for a double-end drive from a centrally located Diesel engine. The belts are run in opposite directions through the use of two drives and clutches

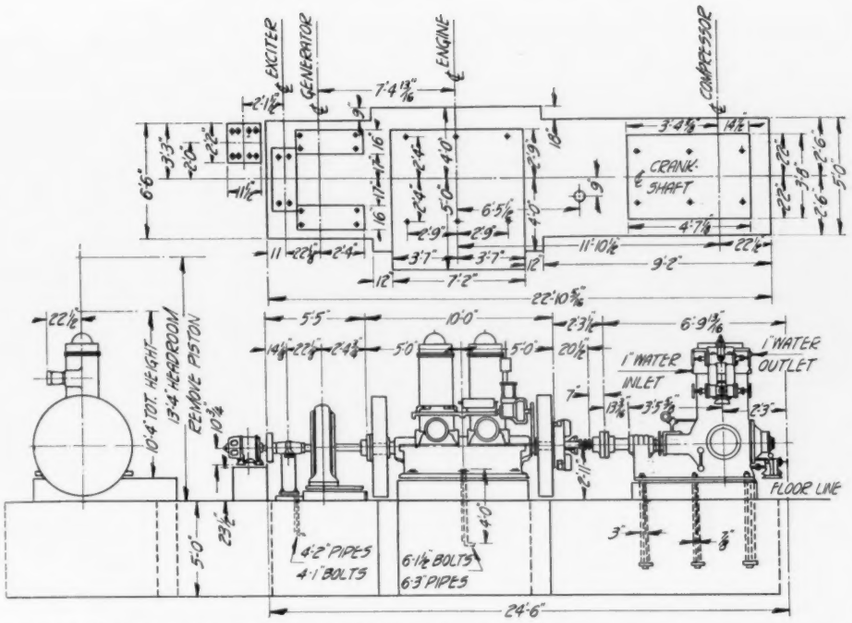


Fig. 9. Combination drive from the Diesel engine. Remote units have an electric drive, and the main unit, such as a compressor, is direct-connected by a belt

point, a crushed-stone plant, also furnishing agricultural limestone or ground limestone for other markets, which may be of such seasonal demand, or sufficiently variable as to require a separate unit. This would be particularly true in cases where the power required for both operations would be the same, in other words a single-unit plant would be operating at 50% load with either one operation. While the Diesel is substantially economical with varying loads over an even wider range of load factor, operation at 50% or lower over long periods isn't the best economy as proven in many cases where two or more units are selected. It is also of little importance to undertake to provide excess power to meet further and probable expansion of the plant, as additional units, particularly Diesel electric units can be added as the business grows. Improved plant factor, load factor and the like is quite feasible with more than one unit, if the operation and load demands have an extremely wide variation as indicated.

(*b*) *Plant layout*—The steps in some plant layouts with the different units placed a considerable distance from each other would require a Diesel electric drive. In many such plants the possibility of Texrope or similar drive is remote, and consequently electric motor drive with a Diesel generating plant furnishing power is adopted. In more compact plants, the electric drive is of less importance. The engine may be placed so near the operation as to make a direct, belt-drive feasible, as is illustrated in Figs. 1 and 2 and Fig. 5. Fig. 3 is a Diesel electric drive where the process requiries it.

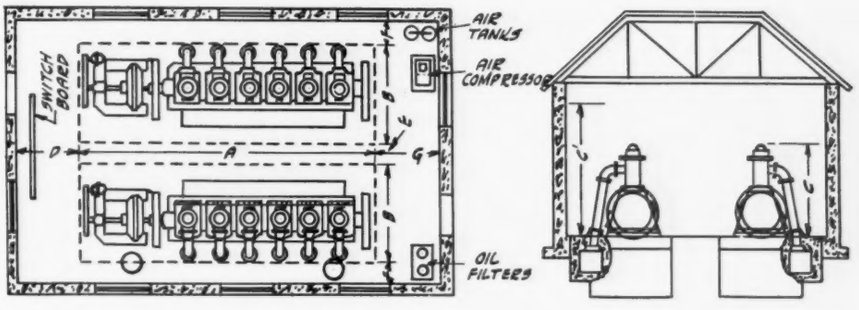
In these larger plants with two or more units, particularly the Diesel electric drive, a separate power house is usually provided and essential. The required floor space, headroom and general arrangement for the average installation is suggested in Table 3.

These dimensions hold good fairly accurately with few changes for the usual stationary type of small unit Diesels commonly found in this service. Building design is shown to be quite simple and not expensive, yet at the same time affording sufficient space, protection of the engine and good working conditions. The cost would vary with the number and size of units installed but not directly as the room, for a thousand horsepower would require only about three times the necessary space for one 200-hp. unit.

(*c*) *Drives*—The direct belt drive is upwards of 30% efficient, whereas the Diesel electric drive, with motor and generator electrical losses, would bring this down to an average of 24%. While the Diesel electric drive has many other points to recommend it over belts and ropes, the cost would in all cases be much more, and the efficiency less. In the smaller plants belts and texrope drives are employed to a great extent, and some remote drives for conveying machinery and the like have proven practicable. Fig. 8 shows how some engines may be located somewhere near the center of operations, and by the use of two drives with clutches, belts are run in opposite directions, and hence are able to take care of the situa-

TABLE III—POWER PLANT LAYOUT FOR GENERAL INDUSTRIAL APPLICATION
OIL ENGINES

H.P.	A			B	C	C'	D	E	F	G
50	14'-0"	11'-4"	13'-6"	10'-0"	10'-0"	13'-6"	4'-0"	2'-6"	3'-0"	7'-0"
100	16'-0"	14'-6"	15'-4"	10'-0"	10'-0"	13'-6"	4'-0"	2'-6"	3'-0"	7'-0"
150	21'-0"	17'-10"	20'-4"	10'-0"	10'-0"	13'-6"	4'-0"	2'-6"	3'-0"	7'-0"
200	21'-10"	21'-0"	21'-4"	10'-0"	10'-0"	13'-6"	4'-0"	2'-6"	3'-0"	7'-0"
300	30'-10"	30'-6"	30'-6"	10'-0"	10'-0"	13'-6"	4'-0"	2'-8"	3'-0"	7'-0"
225	27'-0"	26'-6"	26'-6"	10'-0"	10'-0"	13'-6"	4'-0"	2'-6"	3'-0"	8'-0"
325	33'-0"	32'-0"	34'-6"	10'-0"	10'-0"	15'-6"	5'-0"	3'-0"	3'-0"	8'-0"
400	36'-0"	38'-0"	38'-0"	10'-0"	10'-0"	15'-6"	5'-0"	3'-0"	4'-0"	8'-0"



H.P.	A			B	C	C'	D	E	F	G
	WITH GENERATOR	WITH PULLEY OR BELTED ELECTRIC	WITH CLUTCH PULLEY							
30	13'-7"	11'-4"	12'-1"	10'-4"	10'-6	15'-0"	5'-0"	3'-0"	3'-0"	7'-0"
60	14'-7"	14'-9"	14'-1"	10'-0"	10'-6	15'-6"	5'-0"	3'-0"	3'-6"	8'-0"
80	15'-6"	14'-7"	15'-6	10'-4"	10'-6"	15'-6"	5'-0"	3'-0"	3'-6"	8'-0"
120	16'-0"	15'-6"	18'-5"	10'-4"	10'-6"	15'-6"	5'-0"	3'-0"	3'-6"	8'-0"
180	20'-10"	20'-0"	22'-0"	10'-4"	10'-6"	15'-6"	5'-0"	3'-0"	3'-6"	8'-0"
240	23'-0"	26'-0"	26'-0"	10'-4"	10'-6"	15'-6"	5'-0"	3'-0"	3'-6"	8'-0"
360	30'-4"	34'-0"	34'-6"	10'-4"	10'-6"	15'-6"	5'-0"	3'-0"	3'-6"	8'-0"
400	34'-11"	38'-0"	34'-6"	10'-0"	10'-6"	17'-6"	5'-0"	3'-0"	3'-6"	8'-0"

tion in a practicable manner without the use of too long drives and belts. Again two clutches are often employed in transmitting power to separate units without the intervening counter shafts, jack shafts or belt changing. Even a combination electric drive for remote units, and a belt direct to the main unit may be worked out, as shown in Fig. 9, and again direct connection to compressors as in Fig. 1, with clutch drive for the plant —Fig. 9. The choice of arrangements for drives is very wide and subject to many practical applications.

(*d*) *Cooling equipment*—Many steam plants have been put out of business by a high maintenance cost as a result of the use of very poor water. This will apply to the Diesel. Unnecessary troubles are prevented by a proper cooling system. Unless an ample supply of water free of scale forming hardness is available, a closed cooling system comprising the circulation and cooling of good clean soft water must be provided. However, this is not a costly or serious item, as the Diesel requires such a small amount of water under these conditions of recirculation, that the cost of a cooling system is small. Where insufficient raw water is available for a closed cooling system, a cooling tower with treated water for make-up and evaporation is all that is required.

(3) Power Plant Equipment Cost—Aside from the engine which may have a number of built-in features, the amount of auxiliary equipment is very small with the Diesel. Dusty conditions around a crushing plant make the use of air filters advisable, as well as some lubricating-oil reclaiming apparatus, which will save money in the larger plants. Cylinder contamination from dust and dirty grit is a serious factor that should be appreciated around an oil-engine-driven stone plant of any kind, but the cost of filters for both the air and the oil reclaiming is very small.

(*a*) Equipment cost of various prime movers can be estimated and compared by inspection of Table 2 shown herewith, both for the main units and the auxiliaries. Also complete installation costs are given for various kinds of power plants, together with accurate figures on the average cost of operation, including all items.

(*b*) Complete installation costs would at all times be subject to conditions in each case, however, figures in round numbers per installed horsepower in an average size unit of 300-hp. are given also in Table 2 for use in making estimates. It should be noted that these figures have been worked out after long and careful studies and are fairly accurate and reliable.

(4) Operating Costs and Comparisons—Table 2 is supplied for the purpose of making comparisons with the various prime movers without going into detail discussion. All details of operation and cost items chargeable to power plants are included and reduced to a horsepower year of 300 days of 10 hours each.

(*a*) *Present power cost*—In considering Diesel power, an accurate estimate will have to be made of the present cost of a plant in operation with steam, or power, and the items in the Table serves as a guide in

TABLE II—COMPARATIVE COST ANALYSIS FOR 1 HP. YEAR (300 HP. UNITS) OF VARIOUS PRIME MOVERS

COMPARATIVE COST ANALYSIS OF ONE H.P. YEAR (300 H.P. UNIT) BY VARIOUS PRIME MOVERS													
	CAPITAL INVESTMENT	1 SLIDE VALVE N.C.	2 4-VALVE N.C.	3 4-VALVE COND.	4 UNIFLOW N.C.	5 UNIFLOW COND.	6 STEAM TURBINE N.C.	7 STEAM TURBINE COND.	8 GAS ENGINE ARTIFIC.	9 GAS ENGINE PRODUCER	10 DIESEL AIR INJ.	11 OIL ENG SOLID INJ.	12 ELEC. MOTOR
1	BOILER ROOM 20×30×20 STACK BREECHING-COAL BINS	19.30	19.30	18.75	18.45	18.20	19.30	18.20					
2	PRODUCER ROOM-15×25×20									6.65			
3	ENGINE ROOM-25×20×20	8.87	8.87	8.87	8.87	8.87	8.87	8.87	8.87	8.87			
4	ENGINE ROOM-15×25×20										6.65	6.65	
5	FOUNDATIONS (MACHINE)	6.00	6.00	5.98	5.28	5.26	5.00	4.72	5.32	7.54	7.54	5.32	
6	BOILER & PLANT PIPING	24.40	21.30	22.20	17.73	17.73	24.40	17.73					
7	GAS PRODUCER-COAL BINS ETC.												
8	OIL STORAGE & PIPING								4.44		6.87	5.99	
9	ENGINE & MOTORS	18.30	21.56	21.56	30.90	31.30	13.22	15.50	43.61	59.08	97.95	64.35	21.25
10	AUXILIARIES	4.88	4.66	11.95	4.44	11.75	8.42	15.29	.71	.71	2.35	2.15	
11	INSTALLATION	5.31	5.31	7.51	5.31	7.51	3.23	5.45	7.52	9.75	5.09	2.64	10.10
12	INITIA COST PER H.P.	87.06	87.00	96.82	96.98	100.62	82.44	85.76	70.47	115.87	126.45	87.10	31.35
13	FIXED CHARGES PER H.P. YEAR												
14	INTEREST ON INVESTMENT DEPRECIATION & OBSOLENCE TAXES & INSURANCE	17.41	17.40	19.36	18.19	20.12	16.49	17.15	14.09	23.17	25.29	17.42	6.27
15	OPERATION												
16	SALARIES & WAGES	13.50	13.50	13.30	13.30	13.30	13.30	13.30	6.65	15.95	16.65	6.65	.71
17	FUEL COAL GAS OIL	31.12	24.45	20.50	23.50	17.55	26.05	14.80	37.55	8.50	7.80	9.20	56.60
18	LUBRICATING OIL	.49	.49	.58	.49	.58	.33	.38	1.62	1.62	1.62	1.62	.23
19	COMPOUND WASTE	1.44	1.33	1.17	1.30	.89	1.38	.80	.15	.15	.15	.15	
20	REPAIRS	4.35	4.40	4.84	4.55	5.04	4.15	4.28	3.52	5.94	6.32	4.35	1.32
21	OPERATION COST PER H.P. YEAR	50.70	43.97	40.39	43.14	37.36	45.21	33.56	49.49	32.16	26.54	21.97	58.86
22	TOTAL COSTS PER H.P. YEAR	68.11	61.37	59.75	61.33	57.48	61.70	50.71	63.58	55.33	51.85	39.39	65.13
23	TOTAL-COSTS PER H.P. HOUR	2.63¢	2.36¢	2.30¢	2.36¢	2.21¢	2.38¢	1.95¢	2.44¢	2.12¢	1.99¢	1.51¢	2.51¢

making such an approximate estimate.

(*b*) *Diesel power costs* comprise all the essential charges, and there is included a labor charge that is sufficiently high to cover all cases. The fact that from the Table, Item 16, Salary and Wages, for oil engines, Column 10, the total allowance for, say a 200-hp. unit would be $2130 per year, it should be remembered in the plant illustrated in Figs. 1 and 2, the superintendent states he operates the 180-hp. engine himself, in addition to his other duties. While this compares favorably with an electric current, it can be seen that he could not fire boilers and run steam engines, the cost of which in the same ratio as given would be from column 3 and item 16, $2660 a year, which would possibly be accurate and more nearly the case than the $2130 for the oil engine, particularly in these small units. Further inspection of the figures will reveal that the estimate for oil engines are very liberal in all cases.

(*c*) The daily or annual savings with an oil engine can be quite quickly arrived at from Item 22, Column 5, the up-to-date modern uniflow condensing engine at $57.48 per hp.-year total cost, as compared with the oil engine, Column 11, of $39.39 per hp.-year for Item 22, which in the case of a 100-hp. engine costing about $7000 installed, the savings would amount to the difference between $5748 and $3939, or about $1800 a year, with an unnecessary labor allowance of $1065 a year for the oil engine, which further increases the profit on the Diesel particularly in plants of these sizes to $2800 or more, or approximately a difference sufficient to pay for the engine in 2½ years or thirty months.

(5) Credit and Financing the Diesel Plant—It can be seen that from the savings with the Diesel, including all fixed charges, credit or financing the purchase of a Diesel is really a good banking proposition for the local bankers, and has proven an attractive field for the general financing companies. The writer estimates that at the present time, more than $10,000,000 worth of small Diesels are now being financed in such a manner, with equitable advantage to all concerned. Judging from the sales of some of the larger companies marketing the small unit Diesels successfully, the paper now outstanding is possibly as much if not more than the figure given. There is no difficulty in getting a Diesel plant financed over a couple years, during which time, in most cases, the savings in cash outlay will more than pay for the installation.

(*a*) *Depreciation of Diesels*—This is a subject often discussed without proper understanding. The life of the machinery in useful economical service is what is meant by depreciation. This will depend upon two factors, generally, the care used in operation or application. If the proper application, sufficient size and the necessary auxiliaries, cooling and the like are provided, the question of the life of the machine will depend solely upon keeping it in good operating condition. This means adjustment, repair, and replacement of worn-out working parts.

A great deal of study has been devoted to the subject of maintenance, and this revolves itself into a simple procedure of keeping the machine in good repair. The cost has been time and again shown to average not over $2 to $3 a horsepower-year. Diesel experience over many years has shown that unless an engine is willfully or ignorantly neglected, when it is in need of repairs and overhauling, the life of the machine can be expected to be 20 years, if the amount of $1 or $2 a year is spent on intelligent maintenance and upkeep per installed horsepower. When a man undertakes to get out of paying this small outlay, he has a day coming when it will no longer pay to do anything about it, in short an engine that is too far gone to justify the engine being again put into operating condition.

It should be remembered however, that an engine need not be junked for the sake of pistons and cylinders. One may find that in a 200-hp. two-cycle solid injection engine consisting of four cylinders separately cast, and of the crank case compression type, that originally cost $12,000, the cylinders and main bearings beyond further use. Yet this very engine can be equipped with new cylinders, pistons, bearings, fittings, fuel pumps, perhaps heads, in fact built from the base up, if it has a crankshaft and base that is still good, for from $2000 to $2500 for repairs and a week or so of skilled labor; and engine will be as good as the day it first came out of the shop. It should be put through the same tests and running in as a new engine on the test block, and under the care and supervision of a skilled engineer from the original manufacturer of the engine.

Even cylinders may be rebored for much less than this, but in this case we are assuming that the engine must be rebuilt. A new engine is thus possible for less than a fourth of the cost of the original. Crankshafts, it should be noted, often cost almost half the original price of the engine new, while the base and framework of the engine is a costly casting in most cases. There is really no use to junk an oil engine, except for the lack of knowledge about one. They can be said to truly last a lifetime, unless they become obsolete in comparison with new ones.

Diesels of twenty years ago had practically as good economy for fuel as the present day engines, the advancement has made in design and application, so there is little chance for much improvement in the near future from the standpoint of fuel economy.

(6) Policy and Management Attitude—Questions of policy that may influence the choice of a prime mover, may often relate to the question of taking Diesel responsibility or getting all concerned sold on the idea. There may be doubt as to whether or not the Diesel will sufficiently lower the present cost as to show the estimated savings and considering these elements, proper consideration of the Diesel power may be deferred when as a matter of fact such a step would prove really profitable and advisable.

There are many examples of Diesel economy under nearly every condition that may be studied with a view of making such a decision. There is therefore little or no reason for a Diesel proposition to fall down, once the management is interested in making a sound investigation of the matter. The writer has visited a great number of plants, and in nearly all cases the Diesel economy was so pronounced as to admit no argument.

A great many engineers are not sufficiently informed or familiar with the small Diesel operation, and there the general knowledge of Diesels is not widespread in many places. However, more and more engineers in the rock products industries are advising their clients to investigate the Diesel engine unless power of a reliable nature and at very attractive rates is available.

Considerable study is being devoted to the application of Diesels in the smaller and semi-portable operations, and the entrance of the Diesel into the rock products fields through the channel of the smaller operations first, will eventually open the door for the Diesel in the larger complete power plant.

(*a*) Often there is opposition on the part of some of plant personnel, who feel they can't operate Diesels successfully, which has prevented adequate consideration of the Diesel power question. Experience has shown that a little familiarity with Diesels will often remove such difficulties and leave the management free to go into the subject in a co-operative manner. Such employees need only visit a few Diesel jobs to become in most cases "Diesel conscious."

(*b*) Reliability and maintenance costs have been accurately studied for a period of years by many Diesel students. The accepted facts in the case are that the Diesel costs are considerably less than for steam, and under proper care, with a life of 15 to 20 years, oil engines can be maintained in first-class condition for a matter of $2 to $3 a hp.-year throughout the life of the machine. Obsolete engines of the early make have shown in many cases high maintenance costs, but it has been definitely established that this was due to uninformed operating practice, as much as to the crude design of the earlier engines. The same applies to the present type of engine, and in the majority of cases, carelessness and neglect is the contributing cause for high maintenance. A better appreciation and more education on the Diesel is the only sound remedy for this condition.

Conclusions

The advantages of the Diesel engine in

rock products plants then is quite definite and well established. It has been shown that not only is the Diesel well adapted to many special cases, but there is sufficient evidence that the Diesel power will pay generally in the many different kinds of power plants. Specifically, these facts as shown are:

(1) The relation of power cost to the total production is from one-fourth to one-third of the total operating costs of producing stone.

(2) Taking the average price of crushed stone or gravel, the direct or operating production cost is as high as one-half the selling price in many cases, and has an average of one-third.

(3) When using purchased power or steam-driven plants, in very many instances, the cost for power alone may be the deciding factor in operation at a loss or at a profit.

(4) The fuel and lubricating cost of the oil engine is so much lower than for steam power, that the difference amounts to a fair profit on the business as a whole in so many cases that the Diesel enables the plant to run.

(5) Reliability, and assurance of a steady flow of power, is often the reason of a Diesel, after the purchased power has been tried. In many parts of the country, the investment for lead-in equipment and the demand charges will offset the fixed charges on the engine.

(6) The right kind of a policy of maintenance and operation has more to do with the ultimate cost for upkeep, and depreciation, or the useful economic life of the machine, than any other factor. Life of such machines under right operation should be at least 20 years.

(7) Diesel-engine plants, can be designed and built as any other power plant, along well established engineering lines, with ample assurance of successful and economical operation for a long period.

(8) Contrary to the usual opinion, the location of the engine close to oil fields is not the determining factor in the choice of a Diesel plant, on the other hand, the operating condition, expected life of the business and the possibility of moving the engine is in favor of the Diesel as against steam operation in many quarries and mining projects.

(9) The price of fuel has varied little over the last ten years, and for sometime to come there is little doubt of the supply of fuel at present prices or lower for Diesel engines.

(10) Engines of any size, speed and horsepower from the smallest portable engine of 10 hp. to engines developing thousands of horsepower are available.

In another article I shall show exactly how to determine the feasibility of a Diesel from the standpoint of a given load factor, and the influence of fixed charges upon the load factor as to final and total cost per unit of power. A discussion of applications of the larger powers in cement mill and the like will show how the Diesel successfully competes with purchased power. The question of purchased power will be treated detail. Rates and demand charges will be compared step by step with the different plant factors and load factors, and it will be shown how the Diesel successfully maintains its fuel economy at all loads and plant factors. It will also be shown how the contingent clauses in purchased power contracts, binding for years on the user may prevent him from considering the Diesel if he should desire to do so.

New Sand Group Includes Steubenville Company

THE RECENTLY incorporated Eastern Ohio Sand and Supply Co., Steubenville, Ohio, will have a total of $400,000 in assets and will operate, under this name, pits on the Ohio river between the Pennsylvania railroad and Fort Steuben bridge. This announcement from A. E. Frosch, secretary-treasurer and general manager of the company, follows the report of the merging of the old Eastern Sand and Supply Co. with the East Liverpool Sand Co.

The Eastern company owns seven Ohio river islands between the Ohio state line and Steubenville, properties estimated to contain a good supply of sand and gravel. Besides the river front owned at Steubenville, on land purchased from the Carnegie Steel Co., and which will be ready for operation about the middle of July, the company owns Black's island, near Stratton; the Three Clusters, near Yellow Creek; Baker's, near Wellsville; and Line and Babb's, near East Liverpool.

The Steubenville plant will be equipped with electrically-operated machinery, steel loading and concrete storage bins. The equipment will include a crane. The corporation now deals in sand, gravel and cement. Tile, brick, lumber and other builders' supplies will be handled later.—*Steubenville* (Ohio) *Herald-Star.*

Clearwater Lime Products Starts Operations

THE NEW PLANT of the Clearwater Lime Products Co., located three miles east of Orofino, Ida., completed a successful trial run recently and was placed in full operation to fill orders for lime rock now on hand. A carload of lime gravel was crushed for shipment to Seattle, a request having come for a sample car to be used in surfacing the large new airport in that city. If it proves satisfactory and the price is right, a large order will be placed and many cars of the material will be used on that job.

While operations have started for the filling of current orders, there remains much improvement work to be done before the plant will be running smoothly, efficiently and at capacity. Opening of the quarry, which is located about 1500 ft. up the draw from the mill, has just begun. At present the rock is handled twice from the quarry before it reaches the bins from which the tram buckets are loaded, but this difficulty will be eliminated as soon as a tunnel can be driven into the hill and the rock shot down to a lower level, when it will be necessary to handle it but once.

Under the present scheme, the aerial tramway buckets are loaded at the quarry from bins, brought to the plant and dumped into a large bin. Rock from this bin is delivered to the crusher by means of a conveyor belt and after crushing, the limestone is sized and sent to storage bins. All grades, from dust to 4 in. stone, are produced. The bins have outloading chutes for railroad shipments and also gates for delivering stones to the ground floor for sacking.

The company expects to manufacture stucco, chicken grits, agricultural lime and many other grades for various uses. The foundation work for two large kilns for burning the rock will be started soon and a grade of lime suitable for building purposes will be made when these are finished. Crude oil will be used for the burning process and a large oil storage tank has been ordered for this purpose.—*Orofino* (Ida.) *Tribune.*

National Slag Association Holds Annual Meeting

THE NATIONAL SLAG ASSOCIATION, Cleveland, Ohio, held its 12th annual meeting, June 6 and 7, at its offices in Cleveland. Every member company was represented by one or more men. The guests of the association were H. R. Colwell of the division of simplified practice, Department of Commerce, and F. H. Jackson, senior engineer of tests, U. S. Bureau of Public Roads.

It was unanimously decided by the member companies to accept the services of the division of simplified practice of the Department of Commerce to coordinate the size requirements of the existing specifications of many technical organizations which at present show a wide variation in their limits. A comprehensive survey of the industry will be begun immediately as the first step in the work of simplification of sizes.

At an early date the association will begin a 10-year test program in the laboratory of the Bessemer Limestone and Cement Co. along lines of work which is an extension of certain investigations being accomplished by committee C-9 of the American Society for Testing Materials.

At the directors meeting the following officers were elected to succeed themselves:

C. L. McKenzie, Duquesne Slag Products Co., Pittsburgh, president; C. E. Ireland, Birmingham Slag Co., Birmingham, vice-president; H. J. Love, Cleveland, Ohio, secretary-treasurer.

Estimation of the Quality of Portland Cement by Chemical Methods

By Arthur J. Pool
Chief Chemist, Consolidated Cement Corp., Cement City, Mich.

SINCE the beginning of the portland cement industry there has been evolved from time to time various formulas for estimating the quality of cement from its chemical composition. These formulas are for the most part empirical; experience having brought to light the most desirable proportions and limits of the elements necessary to produce a good cement.

It is believed that of the various compounds present in portland cement the tricalcium silicate ($3CaO \cdot SiO_2$) and the dicalcium silicate ($2CaO \cdot SiO_2$) are chiefly responsible for the cementing properties. The tricalcium silicate hydrates rapidly, and is generally accepted as being the compound that contributes to the cement most of its early strength. The dicalcium silicate hydrates very slowly, and is not believed to contribute much to the strength until after several weeks.

Attempts have been made to calculate from the chemical analysis of cement the amounts of tricalcium and dicalcium silicates present, and thus to evaluate the relative cementing qualities. This method of estimating the quality of cement from the chemical analysis is perhaps the best of any yet devised. However, it has, in common with all such methods, one great drawback; namely, the necessity for the assumption that manufacturing conditions, such as grinding and burning, have been carried out perfectly.

Ordinary Chemical Analysis Gives Little Information

As manufacturing conditions are seldom, if ever, ideal, it is generally agreed that the ordinary chemical analysis can give little definite information as to the cementing value.

The principal reason why this is true lies in the fact that in the ordinary chemical analysis the elements are not reported in the same combinations as they occur in the cement, and it appears to be impossible, for obvious reasons, to determine with certainty from the analysis the manner and extent of the combinations upon which the cementing value depends. Thus any estimation of the quality of cement from the chemical analysis alone is apt to be greatly in error.

Even if the exact amounts of tricalcium and dicalcium silicates could be accurately determined there still would be some question as to the possibility of estimating the true cementing value. For, as Bogue[1] has pointed out, it is not known just how differences in the physical structure of the material, the crystalline or amorphous condition, the presence or absence of surrounding glass, and the surface exposure may affect the strength. Nor is it known just what influence the presence of several lesser compounds may have.

The purpose of this contribution is to describe an investigation carried out by the writer, the results of which appear to indicate the possibility of the development of more suitable chemical methods for the estimation of the cementing qualities than appears to be possible with the methods now in use.

It will be seen that the method used by the writer is not by any means faultless, yet it is believed that the results obtained will be of interest, and possibly of some value as an incentive for further investigation.

Author's Foreword

IN THIS article I describe a simple method by means of which I have been able to calculate with considerable accuracy the seven-day tensile strength of 1:3 standard mortar briquets. The method is not without fault, of course, but I am really enthusiastic about it and believe it would be of interest to most cement chemists, as well as cement men in general.

To my knowledge a similar method has never before been described, and when the article is published I would suggest that you insert a note stating that the author would be glad to learn of the results obtained by anyone testing it out.—The Author.

Changes Undergone by Cement on Gaging with Water

When portland cement is gaged with water the constituent compounds undergo chemical changes resulting in the cement setting and hardening. One of the principal, and perhaps most important changes, is the hydrolysis of the calcium silicates, as it is these compounds which are given chief credit for the strength of cement. These silicates in hydrolyzing form salts of lower basicity and liberate calcium hydroxide, $Ca(OH)_2$.

Lerch and Bogue[2], in studying singly the hydrolysis of pure cement compounds, have shown that when the soluble products are not removed and the water is present in excess of that required to dissolve all the CaO, the $3CaO \cdot SiO_2$ gives up more lime as calcium hydroxide to the solution than does $3CaO \cdot Al_2O_3$, and that $3CaO \cdot Al_2O_3$ gives up more lime than does $2CaO \cdot SiO_2$, $5CaO \cdot 3Al_2O_3$, or $2CaO \cdot Fe_2O_3$. They have also shown that the hydrolysis of $3CaO \cdot SiO_2$, under the conditions of their experiment, proceeds quite rapidly; greatly exceeding that of $2CaO \cdot SiO_2$ at early periods.

In view of these results obtained by Lerch and Bogue, it occurred to the writer that a practical application might be made of somewhat similar work on commercial cements.

As it is generally accepted that $3CaO \cdot SiO_2$ is the principal compound which gives to cement its early strength, and as it has been shown that this compound alone and under certain conditions liberates a larger amount of lime and at a faster rate than does $2CaO \cdot SiO_2$, it was believed that the amount of lime extracted from a cement by water might be, within certain limits, an indication of the cementing value.

Experimental Procedure

Accordingly, experiments were undertaken with the object of correlating the amount of lime extracted from cement under definite conditons with the seven-day tensile strength of 1:3 standard mortar briquets.

In making the investigation it was assumed that the amounts of $3CaO \cdot Al_2O_3$, $2CaO \cdot 3Al_2O_3$, and $2CaO \cdot Fe_2O_3$ present in the cements would be within rather narrow limits, hence the lime extracted from these compounds was expected to be fairly constant. Uncombined CaO and $Ca(OH)_2$ were neglected.

The determinations were carried out at room temperature. One-half gram of cement was placed in a clean dry 500-ml. flask and 400 ml. of freshly distilled water added. The flash was stoppered tightly and shaken occasionally to prevent the cement from setting. At the end of 24 hours the solution was filtered as rapidly as possible, 200 ml. of the filtrate being caught in a 200-ml. volumetric flask. The filtrate in the volumetric flask was transferred to a 600-ml. beaker, 10 ml. of dilute (1:1) hydrochloric acid added, the solution brought to a boil, and the

lime precipitated by adding 10 ml. of a freshly prepared saturated solution of ammonium oxalate and a slight excess of ammonium hydroxide. The beaker was then set aside in a warm place for 30 minutes, after which the precipitate was filtered off, washed 10 times with hot water, about 5 ml. being used for each washing, and the lime determined by titrating in the usual manner with N/40 potassium permanganate.

Results

The tabulated results given below show the relation between the weight of lime extracted from 0.25 gm. of cement and the 7-day tensile strength of 1:3 standard mortar briquets.

The calculated strengths were obtained by the formula:

$$S = a \times K$$

Where S = calculated strength at 7 days in lb. per sq. in.

a = milligrams of CaO extracted

K = a constant for a given brand

$$= \frac{b + c}{d + e}$$

b = actual maximum strength for a given brand

c = actual minimum strength for a given brand

d = milligrams of CaO extracted corresponding to strength b

e = milligrams of CaO extracted corresponding to strength c

Variations Between Actual and Calculated Strengths

The average variation between the actual and calculated strengths is 2.95% for Brand A, and 2.62% for Brand B.

The greatest variation between actual and calculated strength is 6.2% for Brand A, and 5.4% for Brand B.

Eighty per cent. of all the calculated strengths for Brand A vary not more than 4.5% from the actual strengths, and 80% of all the calculated strengths for Brand B vary not more than 4.2% from the actual strengths.

Although the number of tests made in this investigation are insufficient to permit final conclusions as to the value of this method for estimating the quality of cement, the writer believes the results obtained are significant.

Objection may be made to the method on the ground that in practice cement is never used with so large a volume of water (1:800) as was used in this investigation, hence the results obtained from such great dilution are not comparable with those obtained under practical conditions.

Theoretically this may be true, but the method described herein is simply an analytical procedure, and because the conditions under which the investigation was made differ from those in practice it is not necessary to assume that the value of a cement cannot be determined thereby. There is a possibility that the value of a cement as measured under the conditions of this experiment bears a definite relation to the value of the cement under other conditions.

Summary

The procedure used and the results obtained from an original chemical method for estimating the 7-day tensile strength of portland cement have been described.

The results appear to indicate that a relationship exists between the 7-day tensile strength of 1:3 standard mortar briquets and the amount of lime extracted from the cement by a definite amount of water under definite conditions.

References

[1]Discussion by R. H. Bogue of a paper entitled "Lime-Silica Index," by Thaddeus Merriman.

[2]Studies on the Hydrolysis of Compounds Which May Occur in Portland Cement. Wm. Lerch and R. H. Bogue. Paper No. 11, Portland Cement Association Fellowship, National Bureau of Standards.

RELATION BETWEEN AMOUNT OF LIME EXTRACTED AND THE 7-DAY TENSILE STRENGTH

	CaO extracted mg.	7-day tensile strength lb. per sq. in. 1:3 standard mortar briquets		Variation	
		Actual	Calc'd	Lb.	Per cent
Brand A, $K = 6.3$					
Sample 1	51.4	342	324	—18	5.3
Sample 2	51.0	327	321	— 6	1.8
Sample 3	51.0	320	321	+ 1	0.3
Sample 4	51.0	325	321	— 4	1.2
Sample 5	49.6	317	312	— 5	1.6
Sample 6	49.2	297	310	+13	4.4
Sample 7	48.5	313	306	— 7	2.2
Sample 8	47.8	288	301	+13	4.5
Sample 9	47.2	303	297	— 6	2.0
Sample 10	46.4	275	292	+17	6.2
Brand B, $K = 6.9$					
Sample 11	50.5	347	348	+ 1	0.3
Sample 12	50.0	358	345	—13	3.6
Sample 13	49.8	342	344	— 2	0.6
Sample 14	47.5	325	328	+ 3	0.9
Sample 15	47.2	313	326	+13	4.2
Sample 16	46.6	340	322	—18	5.3
Sample 17	46.4	315	320	+ 5	1.6
Sample 18	45.5	332	314	—18	5.4
Sample 19	45.1	310	311	+ 1	0.3
Sample 20	44.9	298	310	+12	4.0

Expectation of Big Construction Year Not Blasted by May Slump

THE BACKLOG of construction contracts signed last year served to maintain construction activities at a high comparable level during May despite recession in the rate at which building contracts are being signed this year, according to a statistical study just completed by the Associated General Contractors of America.

The volume of construction performed during May, as indicated by shipments of basic construction materials, rose 18% over that of April and was the greatest for that month in any year on record. This despite the fact that building contracts have declined 14% during the first four months of this year as compared with the first four months of last year.

With reported contemplated work lower than normal for this season of the year and with contracts for residential work in a definite decline the Associated General Contractors sees in the relatively high volume of current construction activity, evidence that the basic soundness of the construction industry has not as yet been impaired by the excessive speculation in securities.

With evidences that the speculative fever is on the wane it is thought probable that the release in funds for sound investment will again furnish sufficient financing to the construction industry to allow the volume of contracts to pick up to a normal volume. Decline in contracts has largely been in the residential field where apartment house financing has been particularly hard hit by inability to secure funds, it is claimed.

Uses of Ground Mica

MICA WHICH IS NOT SUITABLE for use as sheet mica is classed as "scrap" mica, says the United States Bureau of Mines, Department of Commerce, in a recently issued publication. It is ground to a powder and used in the decorative trade in the manufacture of wall paper, fancy paint, ornamental tile, and concrete facing, and for other purposes; as a lubricant both dry, as for auto tires, and mixed with oil and greases; for axle grease; for annealing steel; as a dusting agent for rolled roofing; for the manufacture of Christmas tree snow; as an insulator for pipes and boiler covering; fireproof paint; and in various other ways.

Mica used in the wall-paper trade is practically all ground to 160 mesh by the wet process. For the rubber industry, as for auto tires, it is ground by both the dry and wet processes to 100-, 160-, and 200-mesh; for the roofing industry it is ground by the dry process to the following meshes; 6-15, 20, 20-special, and 24.

Descriptions of the dry and wet processes for grinding mica are contained in Bureau of Mines Serial 2798.

Holland Sand-Lime Brick Plant*

Arnoud Plant Produces 90,000,000 Brick Per Year

ONE of the world's largest sand-lime brick plants is that built and operated by A. H. Baron van Hardenbroek van Ammerstol at Hillegon, Holland. The "Arnoud," as it is called, was built in 1904 and extensions added and more equipment installed at later dates, so that its present capacity is around 90,000,000 brick per year. The original capacity in 1904 was but 7,500,000 brick, and this was raised to about 25,000,000 in 1914 and further increased in succeeding years to the present large output. Only one plant has a greater output, the Guthmann operation at Niederlehme, Germany.

In building the plant in 1904, allowance was made for future extension and these were added later without interruption of operation. When the new additions were placed in operation the original plant was remodeled and provided with new machinery. The location of the original plant is shown in the cross-hatched section in Fig. 2. The area now occupied by the plant is about 10,000 sq. m. (107,000 sq. ft.) as compared with the 1500 sq. m. (16,000 sq. ft.) of the original plant.

The plant also serves a double purpose; by removing the sand for sand-lime brick manufacture it exposes valuable soil for the cultivation of Haarlem flowering bulbs and at the same time provides masonry brick for use throughout the country.

The raw materials, consisting of coal, dune sand and Belgian white lime, are transported by water. The shipment of sand-lime brick is also mainly by water; only a small amount being transported by trucks or wagons. Climatic conditions make it necessary that great quantities of material be stored for use throughout the winter. All of these factors have contributed to making this plant a large scale operation.

The plant is located on the Haarlem-Leiden-Haag highway, a 400 m. (1300 ft.) long canal, owned by the plant, connecting with the Amsterdam-Rotterdam waterway. The canal is widened in the outer harbor and is bridged by the highway, near which point it connects with a branch canal. Its course then leads along the buildings towards the inner harbor and out to the dunes. The layout shown in Fig. 2 and the airplane view shown in Fig. 1 illustrates clearly these details. The same view shows the branch canal and the highway with its entrance to the plant. Along the highway are located the homes of the employes, consisting of a total of 50 apartments, to which 30 more have been recently added.

The unloading of coal and lime in the outer harbor, which is provided with a retaining wall 250 m. (820 ft.) long, is effected by an electrically operated overhead crane with 20-m. (65-ft.) span and two 11-m. (36-ft.) booms. Two ships can thus be unloaded at once (Fig. 4). Under the crane bridge is located a tightly sealed lime silo, whose doors are opened and closed automatically so that no dust can escape during the dumping of lime. This type of construction originated in the plant. From the silo the lime is loaded into dump cars of 1-cu. m. (1.3-cu. yd.) capacity. As the plant maintains a double track belt line which crosses the highway by a tunnel and runs along the retaining wall to the outer harbor, locomotives are used to haul the dump cars to the lime elevator at the branch canal. This serves also to carry the finished sand-lime brick to storage space between the crane structure, where they are unloaded. The lime hopper can be set aside on a supporting frame built for this purpose, whenever the crane is to be used for the unloading of sand or coal or the loading of brick. The sand for winter use is stored in a direction towards the shore from the crane and is carried to the plant on a special track running in the tunnel. The crane is operated by one

*Tonindustrie-Zeitung **24**, 378-82.

Airplane view of the Arnoud sand-lime brick plant at Hillegon, Holland. The Amsterdam-Rotterdam waterway shows in the background

man and unloads daily about 200 tons of lime or coal. The bridge crane can handle boats of 350-ton capacity if needed, but at present only 150-ton boats can travel in the inner harbor and branch canal.

The sand comes from dune deposits owned by the company and is shipped by means of motor boats and barges (Fig. 3) to storage at the plant. Here they are unloaded by two bucket elevators each equipped with screw feeders at the lower end. These elevators have a capacity of 1.5 cu. m. (2 cu. yd.) per minute. The two bucket elevators operate alternately, so that one is always ready for use. An apron conveyor takes the sand over a revolving screen to a sand storage silo, below which is located the separator equipment.

The excess sand is discharged by the belt conveyor to a special sand storage, of about 10,000 cu. m. (13,000 cu. yd.) sand, provided with specially thick walls to resist the pressure of the piles of sand. During rainy or cold weather, storage sand is used, being taken by a scraper and belt conveyor to the revolving screen.

The lime, brought in dump wagons to the end of the branch canal, is lifted by a large bucket elevator to an apron conveyor which carries it to the reinforced concrete lime building. Fig. 7 shows the dump wagons discharging into the elevator pit. Sand and lime sufficient for two months' run can be stored under cover.

The lump lime is crushed and then conveyed by a bucket elevator and scraper to the lime hoppers located above the three slaking drums. After slaking and sieving, the lime is stored in silos and is passed as needed to an air separator, from which a bucket elevator carries it to a silo located next to the sand silo and above the measuring hoppers.

The measuring hoppers discharge lime and sand on to a mixing conveyor which brings the mixture to edge runner mills where an elevator and scraper feed the rubbed sand-lime mix to the 28 Bernhardi rotary presses. These presses have a capacity of 1350 brick per hour and each pair is provided with one common material cylinder. Presses producing a single brick at a time are said to have proven better than the two-brick presses, as more uniform brick result. The plant has eight presses in the original installation and 20 in the addition. The presses are placed in two parallel rows (Fig. 8), with an electrically controlled platform between which receives four cars and takes them to a track located in an extension of the hardening cylinders. The space in front of the cylinders is sufficient to allow the passage of cars, the empty cars returning to the presses from the shipping end (Fig. 8). There are 12 hardening cylinders, averaging in length about 16.5 m. (55 ft.) and 2 m. (6 ft. 7 in.) in diameter, operating under a steam pressure of 10.5 atm. The total capacity of these cylinders is about 200,000 brick per 12 hr.

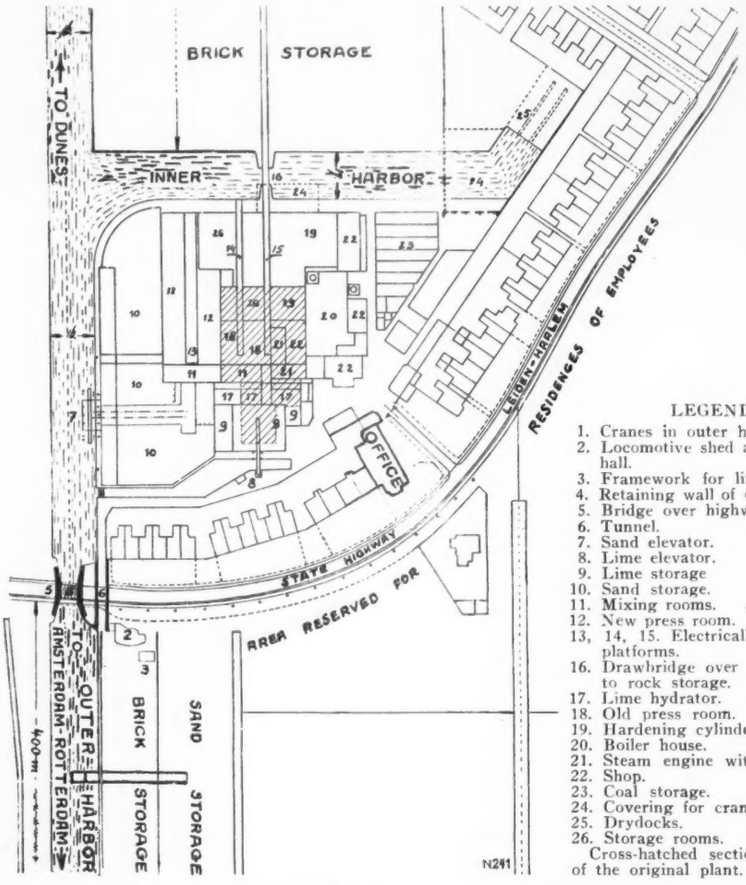


Fig. 2. General layout of the Arnoud sand-lime brick plant

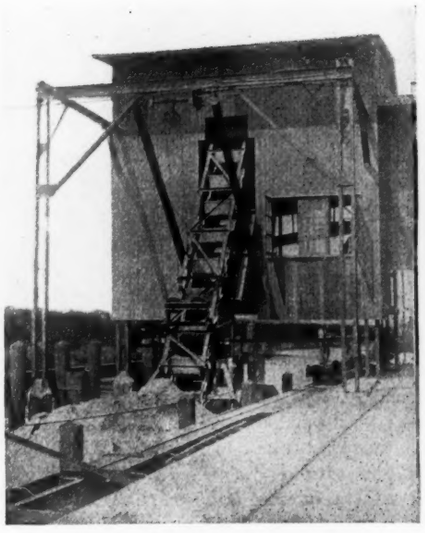


Fig. 3. Sand elevator unloading barges

Fig. 4. Electric unloading crane in the outer harbor

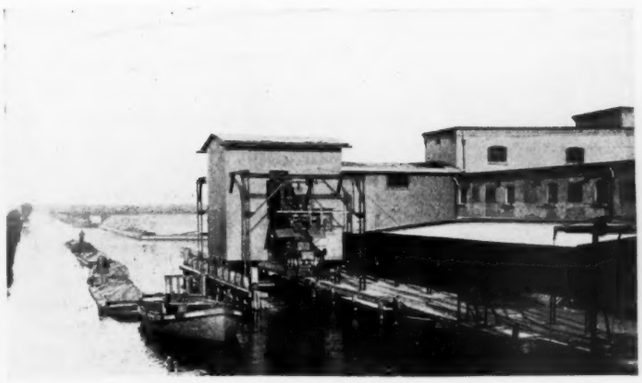


Fig. 5. Electric tug and barges which carry the dune sand to the plant

Fig. 6. Loading finished brick into barges for shipment

The recently built power house contains three large steam boilers each of 125 sq. m. (1345 sq. ft.) heating area, superheaters and automatic stokers. The loading of coal storage bins is also carried out automatically. All of the exhaust steam and condensing water is used in preheating the feed water for the boilers. The equipment includes an exhaust steam preheater for the utilization of the exhaust steam and also an exhaust gas preheater.

Steam Generation

A feature of the boiler room installation is the Ruths steam storage system of 100 cu. m. (3530 cu. ft.) capacity (Fig. 10), which permits uniform and economical operation during periods of peak loads and which stores up steam when consumption is low. This storage cylinder has a capacity of 9000 kg. (198,400 lb.) steam at a pressure range of 10.5 to 1.5 atm. Two boilers and the steam storage cylinder are sufficient to supply all of the steam; one of the boilers being constantly ready for service. In starting up a hardening cylinder, the steam from one of the cylinders which has been in operation is first admitted which results in a pressure rise of about 2 atm. The cylinders are then connected to the Ruths storage cylinder and the pressure raised to that of the latter, leaving the remainder of the steam to be supplied to come from the boilers. A special arrangement was necessary as boilers both with and without superheater were in operation, the superheated steam being used for the operation of the steam engines; while the saturated steam was utilized for hardening of the sand-lime brick. By providing check valves, the saturated steam is prevented from entering the engines, while the superheated steam is equally prevented from entering the dryers. This arrangement was installed in 1923 and has since given good service.

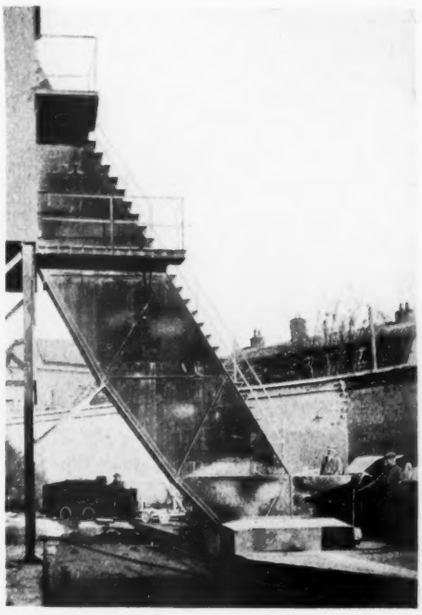


Fig. 7. Unloading lime to storage

Two uni-flow condensing steam engines of a 700 hp. total capacity are operated by the highly superheated steam. A large a.c. generator of 200 k.v.a. generates electricity for power and lighting purposes, electric motors driving the presses in the new press room and operating machinery of all kinds at greater distances, particularly all the cranes. Fig. 11 shows the interior of the boiler room and the steam generating and power units installed.

A smaller steam engine with 30 k.v.a. generator is installed for minor operations in the sand-lime brick plant, driving the machinery in the shops and providing current for the electrically controlled platforms and the cylinder unloading equipment. Another small steam engine with dynamo runs in the night time to furnish light and power for

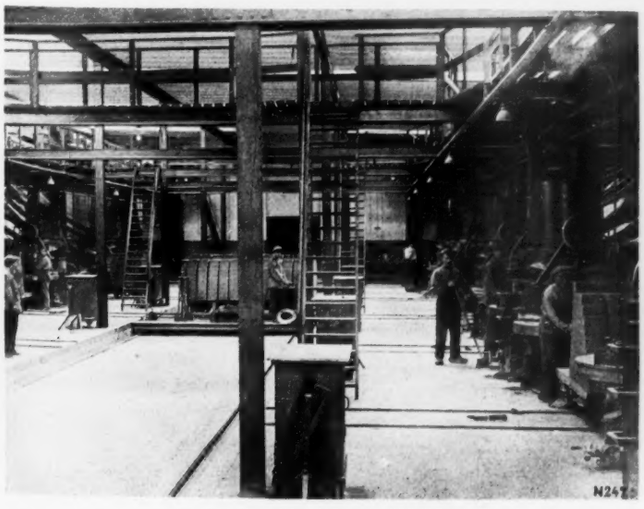


Fig. 8. Section of the press room showing the arrangement in parallel

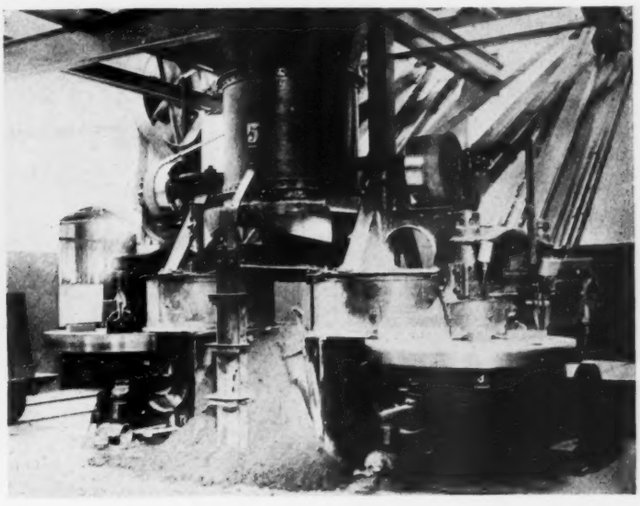


Fig. 9. Front view of one of the presses

the boiler house and the cylinders, which are operated continuously.

Loading and Storage

The loading and unloading of the hardening cylinders is carried out mechanically through automatically moving platforms. These carry the brick to the inner harbor, where two loading machines load the brick into boats (Fig. 6). The loading mechanism operates from two revolving cranes and the arrangement permits the simultaneous loading of six boats. The harbor is so wide that boats may be loaded along both shores and still leave sufficient space for other boats to pass in the center. Two covered drydocks are built in the inner harbor, where all ships are repaired. Cover docks are also provided to permit crane operation in rainy weather. The retaining walls of the inner harbor are about 2000 ft. long and sufficiently strong to allow the boats to dock directly at the company's wharves, which are about 800 ft. in length.

There are also other storage buildings, a number of secondary buildings and different shops for wood and steel work, a well equipped machine shop, a forge shop and a construction department so that all installation of new equipment and other work can be efficiently carried out. This arrangement permits a small space for storage of spare parts. All work of remodeling of the plant was planned and made by the management of the plant as well as a large part of the design and construction of the necessary machinery, especially of the conveying equipment.

All the brick made at the plant are 214x 55x104 mm. (about 8½x2¼x4 in.). Only one shift, operating during the day is necessary for the large production. Baron van Hardenbroek is the principal owner.

Fig. 10. Steam storage cylinder at the Arnoud plant

Gypsum Wallboard Patent Controversies Settled

THE RECENT SETTLEMENT of patent litigation which has been carried on by United States Gypsum Co. for a number of years against several gypsum producers for infringement of patents on gypsum wallboard, should go far toward correcting the conditions which have been responsible for the industry's steadily diminishing profits.

Under the settlement, the United States Gypsum Co. granted licenses to manufacture gypsum wallboard under its patents to several important producers. Settlement also provides for back payments to the United States Gypsum Co. through past infringements. The companies now licensed by the United States Gypsum Co. to manufacture wallboard include practically all of the board producers in the United States.

The licensing of the additional number of wallboard manufacturers by the United States Gypsum Co. will stabilize the quality and prices of articles manufactured under the company's adjudicated patents, which cover both the method of fabrication and the product fabricated. It should also put an end to below-cost selling of the product to the trade and its disastrous effect on profits.

Perhaps the most important accomplishment of the settlement was to bring the leading gypsum interests into harmonizing relations for the purpose of eliminating the long continued litigation and the competitive practices which bear much of the responsibility for the distressed conditions of the industry.

The settlement involves only the manufacture of gypsum wallboard and does not extend to any of the other gypsum products on the market. Generally speaking, however, the wallboard business is a very important and growing factor, and under ordinary circumstances is one of the profitable branches of the industry.—*Wall Street Journal* (New York City).

Resistance of Slag and Slag Concrete to Certain Agencies

SYMPOSIUM No. 17, "Resistance of Slag and Slag Concrete to Certain Destructive Agencies," has been released by the National Slag Association, Cleveland, Ohio. The bulletin gives various abstract data on the durability of slag concrete and the soundness and stability of the aggregate itself under the corrosive action of agencies such as weathering, seawater, alkali waters, acid fumes, acid sewage and others.

Fig. 11. Interior of the steam generating plant

Trade Commission Gives Endorsement to Rules Adopted by Gypsum Industry

Thirteen Regulations Are Affirmatively Approved; Eight Provisions Accepted as Business Policies

THE FEDERAL TRADE COMMISSION, it was announced June 8, has taken action on 21 rules for trade practices adopted by the gypsum industry, giving affirmative approval to 13 rules, relating to practices having to do with actual violations of law, and accepting the remaining eight as expressions of policy of the trade.

Resolutions Adopted

The commission's action, it was explained, was based upon resolutions adopted at a trade practice conference held in New York in March at which 98% of trade, on the basis of tonnage, was represented. (See ROCK PRODUCTS, April 13, pp. 94-95.)

The full text of statement of the commission explaining its action follows:

"Twenty-one rules of business conduct adopted by the industry were approved by the commission after making amendments. As finally acted upon by the commission, there are 13 rules in Group I, affirmatively approved, meaning that they relate to practices having to do with actual violations of the law. The other eight rules are in Group II, accepted as expressions of policy of the trade.

Bribery Condemned

"Among practices covered by Group I rules are: Commercial bribery, misbranding, inducing breach of contract, sale of products without profit, defamation of a competitor, fraud, misrepresentation and others. The Group II rules cover such subjects as inducing sales by other products, commercial bribery, sales without mutuality, transit shipment, pooled and combination cars, terms of sale, use of the term 'cost' and patent or trade-mark infringements.

"Both Group I and Group II contain rules regarding commercial bribery. The Group I rule has to do with 'the paying, or promising to pay, to an employe of a customer or a prospective customer, of a commission or consideration of any character for the purpose of inducing or compensating for a sale,' while the Group II resolution on commercial bribery concerns 'the offering or giving of commissions, prizes, premiums or gifts as an act of commercial bribery to anyone in connection with the sale, purchase or use of any products distributed by manufacturers within the industry, or as an inducement thereto.' Commercial bribery as defined in Group I is declared to be an unfair trade practice, while in Group II it is condemned as a business policy."

Group I Rules Approved

The full text of the rules as amended by the commission and affirmatively approved or accepted as expressions of the trade were made public as follows:

The rules in Group I were affirmatively approved and the rules in Group II were accepted as expressions of the trade.

Group I, Rule 1—*Commercial Bribery.* The paying, or promising to pay, to an employe of a customer or prospective customer, of a commission or consideration of any character for the purpose of inducing or compensating for a sale is an unfair trade practice.

Rule 2 (formerly Resolution 3)—*Branding.* The marking or branding of products for the purpose and with the effect of misleading or deceiving the purchasers with respect to the quantity, quality, grade or substance of the goods purchased is an unfair trade practice.

Rule 3 (formerly Resolution 4)—*Inducing Breach of Contract.* The wilful interference by any person, firm, corporation or association, by any means or device whatsoever, with any existing contract or order between a seller and a purchaser, in or about the purchase or sale of any product handled by the industry, or the performance of any contractual duty or service connected therewith, such interference causing a breach of an existing contract or order and being for the purpose or with the effect of dissipating, destroying or appropriating, in whole or in part, the patronage, property or business of another engaged in such industry is an unfair trade practice.

Note: Whenever notice of existence of a contract or order is brought to the attention of any person in any way, he shall promptly discontinue all efforts to induce a contracting party to break such contract or order.

Sale of Products Without Profit

Rule 4 (formerly Resolution 7 as amended)—The sale of products without profit for the purpose of injuring a competitor, or with the effect of lessening competition, is an unfair trade practice.

Rule 5 (formerly Resolution 8)—*Defamation of a Competitor.* The defamation of a competitor in any manner, either by imputing to him dishonorable conduct, inability to perform contracts or questionable credit standing or a false disparagement of the grade or quality of his goods or otherwise, is an unfair trade practice.

Rule 6 (formerly Resolution 9)—*Fraud and Misrepresentation.* The making, causing or permitting to be made or published any false untrue or deceptive statement by way of advertisement or otherwise concerning grade, quality, character, nature, origin, manufacture or preparation of product is an unfair trade practice.

Rule 7 (formerly Resolution 10)—*Selling Goods Below Own Cost.* Selling of goods below own cost for the purpose of injuring a competitor and/or with the effect of lessening competition is an unfair trade practice.

Rule 8 (formerly Resolution 11)—*Threats of Suit for Patent or Trade-mark Infringement.* The circulation of threats of suits for infringement of patent or trade-mark among customers of a competitor not made in good faith, but for the purpose of harassing and intimidating customers, is an unfair trade practice.

Rule 9 (formerly Resolution 12)—*Enticement of Employes.* Interference with a competitor's business through the enticement of his employes from his employment is an unfair trade practice.

Imitation of Trade Marks and Trade Names

Rule 10 (formerly Resolution 13)—*Imitation of Trade Marks and Trade Names.* The imitation of the trade marks or trade names of a competitor results in deception to buyers and consumers is an invasion of the property rights of such competitor and is an unfair trade practice.

Rule 11 (formerly Resolution 17)—*Discrimination in Price and Terms.* Section 2 of the Clayton Act provides: "That it shall be unlawful for any person engaged in commerce in the course of such commerce either directly or indirectly to discriminate in price between different purchasers of commodities . . . which commodities are sold for use, consumption or resale where the effect of such discrimination may be to substantially lessen competition or tend to create a monopoly in any line of commerce. Provided, that nothing herein contained shall prevent discrimination in price between purchasers of commodities on account of differences in the

grade, quality or quantity of the commodity sold, or that makes only due allowance for the difference in cost of selling or transportation, or discrimination in prices in same or different communities made in good faith and to meet competition, and provided further, that nothing herein contained shall prevent persons engaged in selling goods, wares or merchandise in commerce from selecting their own customers in bona fide transactions and not in restraint of trade."

Any violation of the above law shall be considered an unfair trade practice.

Rule 12 (formerly Resolution 19)—*Rebates.* The payment or allowance of rebates, refunds, credits or unearned discounts, whether in the form of money or otherwise, for the purpose and with the effect of extending to certain purchasers special services or privileges not extended to all purchasers under like terms and conditions is an unfair trade practice.

Rule 13 formerly (Resolution 20)—*Unfair Specific Practices.* Included within the practices prohibited, where they constitute rebates and where they are indulged in for the purpose and with the effect of discriminating in prices and terms among purchasers of the same class purchasing under like conditions, are price concessions in the furnishing of materials without charge, giving of allowances of advertising not actually placed, the making of allowances on damaged sacks in excess of their actual value, the making of allowances for unsupported claims or shortages of goods in transit, the making of allowances on unverified complaints of the quality of goods, and shipments without charge in excess of the stated quantity ordered or contracted for.

Group II Rules Accepted as Expressions of Trade

Group II, Rule 14 (formerly Resolution 6 as amended)—*Inducing Sales by Other Products.* The practice of offering a product as a leader, as an inducement for the purchase of one or more other products is condemned by the industry as an unsound business practice.

Note: Rule 15, formerly Resolution 14, was stricken out because covered in principle by Rule 11, Group I.

Rule 15 (formerly Resolution 2)—*Commercial Bribery.* The offering or giving of commissions, prizes, premiums or gifts as an act of commercial bribery to anyone in connection with the sale, purchase or use of any product distributed by manufacturers within the industry, or as an inducement thereto, is condemned by the industry.

Rule 16 (formerly Resolution 5)—*Sales Without Mutuality.* A contract of sale which permits the buyer to cancel or provide for a reduced price in the event of a market decline and which does not permit the seller to cancel or provide for an enhanced price in the event of a market rise is lacking in mutuality and tends to induce controversy and breach of contract, and is, therefore, condemned by the industry.

Transit Shipments Condemned by Industry

Rule 17 (formerly Resolution 15)—*Transit Shipments.* The practice of making shipments, other than those involving mere transfers of material to the warehouse or plants of the shipper, without in each case having an order from the customer for the shipment at the time of making the same, is condemned by the industry.

Rule 18 (formerly Resolution 16)—*Pooled and Combination Cars.* The sale of products to separate purchasers as full-carload or other group lots at a price which does not take into consideration all transportation charges is condemned by the industry.

Rule 19 (formerly Resolution 18)—*Terms of Sale.* The industry hereby records its approval of the practice of establishing definite terms of sale, and the reasonable adherence thereto, and the continued violation by a manufacturer of his terms for the purpose and with the effect of price discrimination is condemned.

Rule 20 (formerly footnote to Resolution 10, now Rule 7)—The term "cost," as used in Rule 7, shall be interpreted to include among other items the cost of raw materials, transportation thereof, manufacturing, depreciation, depletion, obsolescence, interest on investment, selling and administrative expense. It is the judgment of this conference that all manufacturers of gypsum products should adopt a uniform cost system.

Rule 21 (formerly footnote to Resolution 11, now Rule 8)—The owner of a patent or trade mark should, in fairness, first notify the alleged infringer before proceeding against his customers.

Subscription Form Used

Under date of June 6 the Federal Trade Commission sent to the gypsum industry the following form to be signed and returned:

FEDERAL TRADE COMMISSION,
Washington, D. C.

In consideration of the abandonment by others in the industry of practices covered by rules adopted in resolution form at the Trade Practice Conference held by the Federal Trade Commission for the Gypsum Industry, at New York City, March 28 and 29, 1929, and for the purpose of placing as near as may be all in the industry on an equally fair competitive basis, the undersigned hereby subscribes to, and the undersigned and such others as now have subscribed or in the future shall subscribe, hereby mutually agree to abide by said rules, copy of which has been received and read by the undersigned.

.....(Name of company)

(Name and title of officer signing).....

.....(Address of company)

Date.....

Five Rules for Fair Practice Accepted by Allied Construction Industries

FIVE PRINCIPLES of fair practice agreed upon by the Allied Construction Industries Committee, on May 14 at Cleveland, were concurred in by the Associated General Contractors at the May 16 meeting in Oklahoma City of the Executive Board, Advisory Board and Secretaries' Council of that organization.

The principles are as follows:

1. All charges comprehended within general conditions of the specifications in work let under a general contract shall be assumed and paid for by the general contractor, and no part of the same shall be prorated or charged back to subcontractors, and subcontractors' proposals or estimates shall carry a notification as follows: "No pro rata or other charges arising out of general conditions are included."

2. All subcontractors shall carry and pay for workmen's compensation insurance in states where such compensation insurance is operative, and general liability insurance where compensation insurance is not operative and in addition general public insurance to protect themselves upon the work they are doing. Compensation and other insurance shall be placed by the subcontractor in any company licensed to do business in such state where the work is to be done, without any restriction by either the owner or others.

3. When general contractors have taken or canvassed bids, before bidding on work, they shall not again take or canvass bids, but they shall award to the work to the subcontractor, submitting the bid upon which they secured the work. A general contractor, when making up his estimates, is not entitled to receive bids from subcontractors, if he is at the same time making himself their competitor by figuring their portion of the contemplated work, or by arbitrarily discounting the bids so given him.

It is legitimate for a general contractor to figure all portions of the work, depending upon no one for what are usually known as sub-estimates, but it is not legitimate for him to receive bids from others for subwork and then to figure those portions or to discount them in competition with subbidders.

Announcements to Be Made When Lien Rights Waived

4. In event that a general contractor waives the right of lien of subcontractors on a construction project, he shall, before entering into contract with any subcontractor selected, give the subcontractor notice of that fact in writing, and shall provide an indemnifying bond to insure payment to the subcontractors.

5. The practice of financing or guaranteeing accounts of general contractors is detrimental to the best interests of the entire construction industry and building public.

Two Carolina Crushed Granite Producers Merge

THE Weston and Brooker Co. of Columbia, S. C., and the Southern Crushed Stone and Granite Co. of Trenton have merged under the name of The Weston and Brooker Co., according to recent announcement received direct from the company. The announcement continues:

"The same business policies of open and fair dealings with all, customers, competitors and the public, which this company has heretofore maintained, will be continued and strengthened. The same pre-eminent position in the quality and preparation of crushed granite and its distribution will be maintained and improved.

"This company is in no other business and has no other interests or alliances than those here publicly set forth—the operation of quarries and the distribution of quarry products for proper use in a proper manner.

"In this business and on these principles this company expects to continue to get and merit the patronage of its customers and the respect of its competitors and the public."

New California Portland Cement Project Seeks Permit

APPLICATIONS for permits for the Paramount Portland Cement Co.'s $5,000,000 plant at the southern boundary of Torrance, Calif., were made recently by Manager G. S. Moore. The permits call for the erection at the present time of three buildings, which are to include a machine shop, two stories in height and 187x60 ft. in dimension, a silo and an office building.

Plans for the development of the plant, according to Mr. Moore, include the installation of a dust collecting system costing $225,000 with specially constructed electric motors. Other buildings to follow are a 200,000-bbl. storage room, a clinker storage for cement before it is ground and two kilns which are to be the largest of their kind in existence.

The plant, which will employ 250 men, is situated in the industrial tract adjoining Lomita and Palos Verdes Hills.—*Los Angeles* (Calif.) *Times.*

Eastern Rock Products, Inc. Buys Chenango Deposits

ACCORDING to recent report in the *Binghampton* (N. Y.) *Sun*, the Eastern Rock Products, Inc., has purchased sand and gravel deposits in the town on Chenango, N. Y., from the Broome County Sand and Gravel Corp., Utica, N. Y.

The tracts deeded include one lot of 10.392 acres at the juncture of the Chenango Bridge and Kattellville road. A second comprises 10.334 acres off the highways and a third a tract of 46.5 acres along the Lackawanna Railroad right of way and bounded on another side by Thomas Brook. Three or four other lots and rights of way are also included.

The deed is signed by H. R. Beebe, president of the grantor corporation, which secured the properties under a bankruptcy sale. These holdings were formerly owned by the Steward Sand & Gravel Corp., now defunct.

Three Killed in Quarry Blast

THREE MEN were killed and two others seriously injured in a premature blast at the Belmont-Gurnee Crushed Stone Co.'s quarry at North Bergen, N. J., brief details of which appeared in the issue of ROCK PRODUCTS, June 8, p. 112.

Two of the men killed were working over a shot-hole, tamping down a part of the charge, when the explosion occurred. It is believed that friction ignited the charge in the hole and the subsequent blast set off the balance of the dynamite which was in boxes near the hole. The 600 lb. charge of dynamite was somewhat smaller than usual, according to the foreman, Thomas Donato, for in all other blasting 700 to 800 lb. was customary. Mr. Donato had been standing over the men who were tamping, but had moved about 60 ft. away just previous to the blast. He was knocked down but escaped injury.

About 60 men were employed at the quarry which is one of the largest in New Jersey. Some fears were felt that some of the men might have been caught under the rock deluge, but search of the debris revealed nothing. An investigation of the fatality has been ordered by county police.

William Dehm, the superintendent, told the police that the quarry was seventy acres in extent and had been in operation for 25 years, but that this accident was the first of its kind there. Quarrymen said that it was "just one of the unaccountables that occur in the handling of dynamite."—*New York* (N. Y.) *Sun.*

Eastern Silica Adds New Unit

EASTERN SILICA and Chemical Corp., Winchester, Va., and plant at Gore, W. Va., is now installing an additional unit which is expected to increase capacity by about 150%. This is part of the expansion program as announced in ROCK PRODUCTS, June 8 issue. The plant is operating at full capacity, while the changes are being made.

The additional facilities include a crusher, chaser mill and washers complete, which are being supplied by the Lewistown Foundry and Machine Co., Lewistown, Penn., and a Diesel engine outfit, to generate 240 hp., furnished and erected by Fairbanks, Morse and Co., Chicago. The new equipment is expected to be ready for operation by July 15.

H. M. Hadley Receives New P. C. A. Appointment

AS THE FIRST STEP in an enlarged structural program, the Portland Cement Association recently announced the appointment of Homer M. Hadley as regional structural engineer for the Pacific Coast. Mr. Hadley is to act in an advisory capacity to architects and engineers for the territory of California, Nevada, Arizona, Oregon, Washington and British Columbia.

Homer M. Hadley

For the last seven years Mr. Hadley has been in the employ of the Association as field engineer and then as district engineer with offices in Seattle. He brings to his new post a structural experience both wide and varied.

Following the Tokyo and Santa Barbara earthquake disasters, Mr. Hadley served as investigating engineer for the Association. In both instances he rendered valuable assistance to structural engineering through his detailed surveys and reports of the effect of earthquakes on all types of construction.

The appointment of F. J. Barrett as Seattle district manager was also announced by the Portland Cement Association. Mr. Barrett has been connected with the association for a number of years.

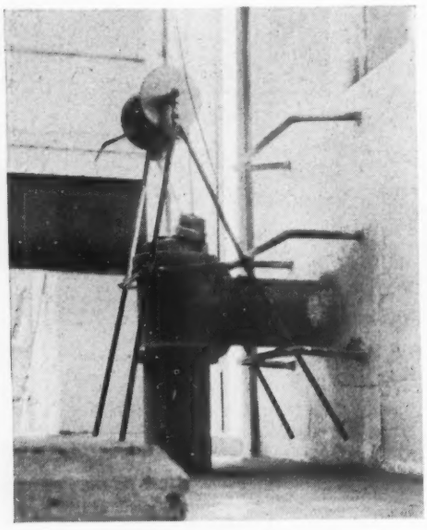
Florida Portland Adds New Clay Pit

FLORIDA PORTLAND CEMENT CO., which draws most of its raw material from the vicinity of Brooksville, Fla., has just opened a large new clay pit 12 miles northwest of that town. The new property comprises about 100 acres, of which about 12 acres have been developed. A spur line has been built connecting the property with the Seaboard Air Line R. R. tracks.

Hints and Helps for Superintendents

Estimating the Quantity of Cement in Silos

IT is sometimes a difficult matter at a cement mill to tell how much cement there is in a storage silo, especially if the bin is being filled at the time of making observations. At the Cuban plant of the International Cement Corp. there is in use a reel with a light chain attached and on this chain at intervals of 1 ft. are fastened small circular brass number plates and a heavy "sinker" on the end. The reel is mounted on a suitable portable "A" frame and can be transferred to any of the silos for use. It is operated by simply dropping the sinker to the top of the cement pile for a measurement, the figures on the brass checks indicating the amount of cement in that particular silo.



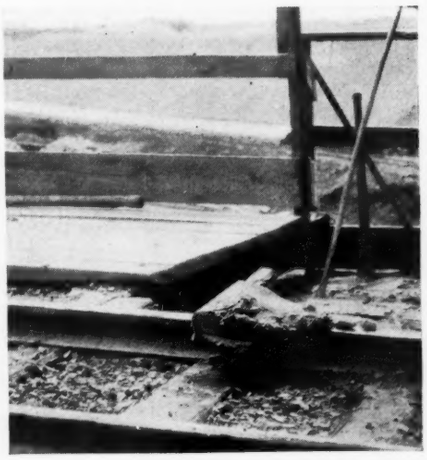
Device measures amount of cement in storage silo

An Effective Car Stop

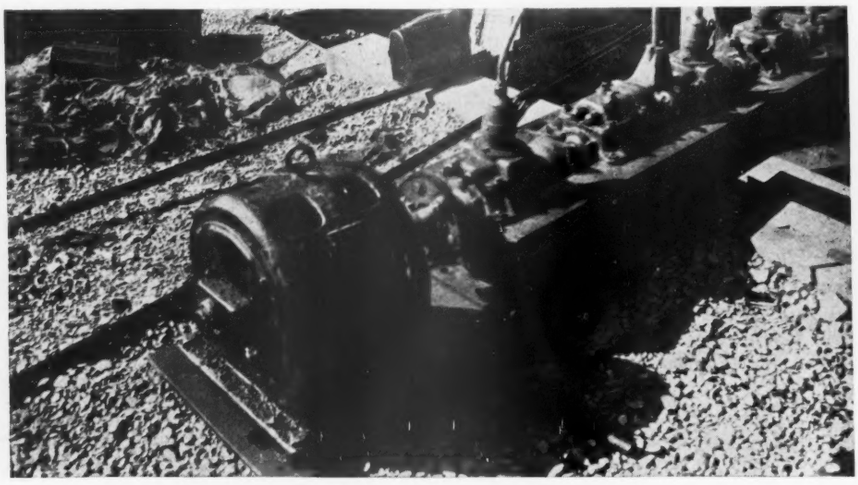
AT the old Casparis plant which is now a part of the Marble Cliff Quarries Co. operation near Columbus, Ohio, the Woodford haulage system is used. As the cars come up to the crusher they are slowed down somewhat by the operator in the control tower, and as they pass the dumping pit they are automatically reversed and stopped. At times, however, these cars for one reason or another go beyond their intended stopping place, and to prevent the car getting off the last controlled rail section, car stops or rail brakes of the type shown in the illustration are provided.

These stops are simply old pieces of rubber belting folded and nailed to a stick of hardwood. They are laid on the rails, as shown, with two or three small pebbles placed in front so that the car wheel runs over the pebbles and up on the feather edge of the stop. The crushed particles thus produced act to help prevent the stop itself from slipping, although the natural properties of rubber contacted with steel in this fashion also prevents slippage.

The action of this brake is such that the car wheel runs up on to the rubber mat and the wheel and stops, then slide a short distance, coming to an easy, non-jarring stop without danger of derailment, as is the case when old lumber or steel chains are used for this purpose.



Effective quarry car stop



Variable speed device made from old automobile transmissions

Home-Made Variable Speed Transmission

By L. E. REDDING
Superintendent, Nickel Plate Sand and Gravel Co., Erie, Penn.

AN ECONOMICAL AND SUCCESSFUL variable speed reducer was built at our shop by the use of four 1923 model Chevrolet transmissions. The 1923 model transmissions were used because of the extensions on either side by which they could be bolted down, as they are a self contained unit.

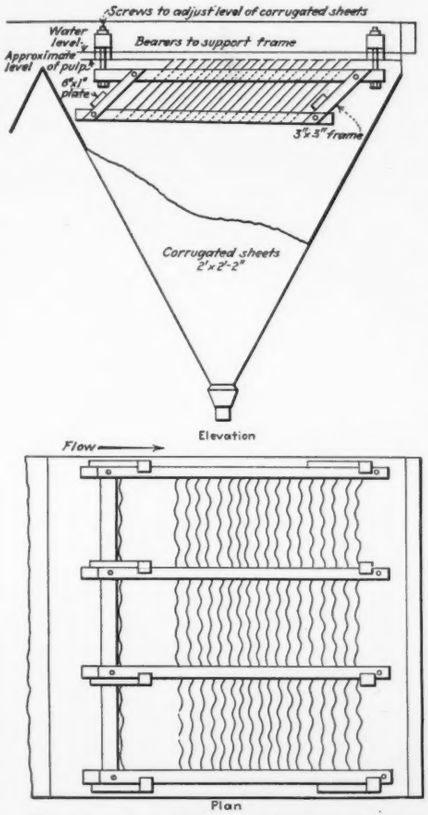
A 5-hp. motor at 1200 r.p.m. is the power unit and this is connected to a No. 1 transmission by a flexible coupling from a Maxwell drive shaft, one-half keyed to motor shaft and the other half welded to the high speed shaft of the transmission.

To connect the remaining three transmissions the high speed shafts were removed and the ends spleened to correspond to the front end of a Chevrolet drive shaft and by using the universal joints this allowed the transmissions to be placed close to each other. For the power take off a short piece of 1 11/16-in. shaft running in two regular pillow blocks was used. This shaft is also spleened at one end to fit the universal. The other end has a six-tooth sprocket for No. 103 chain keyed on. All parts are mounted

on two pieces of 7-in. I-beam, the motor securely bolted to a piece of ¾-in. plate which extends 16 in. under and strongly bolted to the beams. This arrangement makes a speed reducer of a very large range of speeds, as the six-tooth sprocket drives one of 30 teeth (a 5 to 1 ratio) running a 24-in. pulley on a sand feeder. The six-tooth sprocket may be run at motor speed (1200 r.p.m.) or as low as 18 r.p.m. by the shifting of gear in transmissions, allowing a belt speed of approximately 22 to 1500 f.p.m.

Simplifying the Settlement of Clayey Material

AREA is the dominant factor in thickening, according to an article by E. G. Howe in one of the recent issues of *Engineering and Mining Journal*. He notes that thickeners as large as 325 ft. in diameter have been built and says that the requirement of area varies from 2½ sq. ft. to 30



Details of a device to increase the capacity of settling cones

sq. ft. per ton of solids handled. Where protection from freezing is needed the cost of roofing over and heating these large areas is a serious item.

In recognition of the need for reducing area various devices have been placed on the market. They combine suction and pressure to produce filtration and most of them are intermittent in their working. The author estimates that the probable increase in capacity per square foot of area obtained by these devices is about 100%.

Cones have given remarkably good results as thickeners, according to this paper. There is cited a set of 26 ft. conical tanks, 23 ft. 9 in. deep, which treated, each, 406 tons of clayey pulp, sp. gr. 1.036, in 24 hr., making a clear overflow. The feed contained 8% of solids and the discharge 39%. The author also says that at a plant in his charge the capacity of a thickener was practically doubled by allowing a cone to build up in it.

This is accounted for by the rapid settlement of solids on an inclined plane, and the paper says that this may be tested by filling two glass cylinders with clayey pulp and inclining one at 45 deg. The solids in the inclined cylinder will be found to settle to the compacting zone four times as fast as in the vertical cylinder.

Utilizing this principle of rapid settling on an inclined surface, B. L. Gardener, at a South African mine, placed inclined baffles in the upper part of a pyramidal tank, or *spitzlutte*. A similar tank without the baffles gave an underflow with 26% of solids, while the tank with the baffles gave an underflow with 41% solids. Experiments made by the Anaconda Copper Co.'s engineers gave somewhat similar results. The author figures that there is a possibility of increasing the capacity of thickeners 44% by some use of inclined baffles.

To apply this on a large scale the author suggests a conical excavation lined with concrete, surmounted by a vertical part made of concrete or sheet steel. The thickened material could be removed by a diaphragm pump and the baffles could be suspended by a truss over the tank.

Folding Conveyor

THE BERKELEY plant of the North American Cement Corp. produces principally burned lime, and no portland cement whatsoever. The plant also produces crushed commercial limestone and flux stone.

Bulk lime is drawn from the vertical kiln to a short pan conveyor feeding a belt conveyor which in turn loads the material into box cars. It is interesting to note that the lime is drawn from the kilns sufficiently cold to be readily handled on a rubber belt.

The interesting point about this conveyor is its construction; its frame folds in the middle, allowing the conveyor to pass through the car of the door that is being loaded. When the car has been loaded the rope blocks which are attached to a bail near the center of the conveyor fold the conveyor so as to allow the car to pass on.

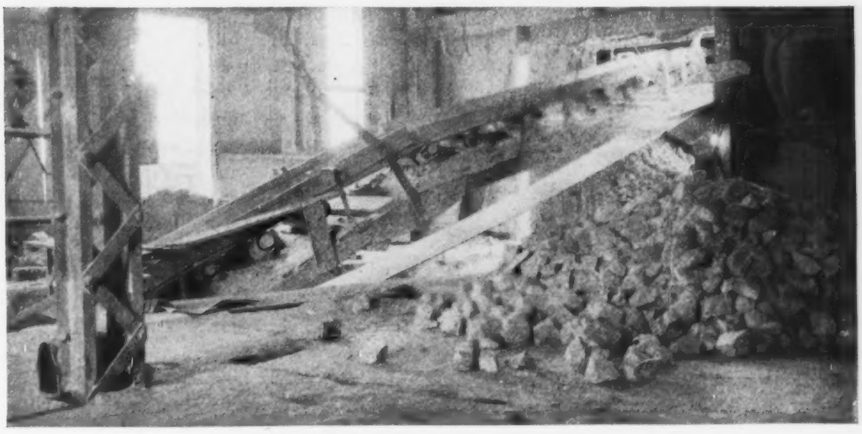
Sampling Gravel Deposits

AT the Circleville, Ohio, sand and gravel plant of the Sturm and Dillard Co. the deposit was thoroughly sampled by means of a small orange-peel prospecting bucket

Nested screens for gravel deposit samples

supplemented by test pits as well.

The samples secured by these tests pits were screened through the screening device shown in the illustration and which consists of a series of rectangular screens mounted on small rollers all nested one above the other for convenience of operation.



Folding conveyor aids in loading box cars

National Lime Association to Meet in Washington, June 26-28

Trade Practice Conference on June 27 Under Auspices of Federal Trade Commission

THE NATIONAL LIME ASSOCIATION will hold its first general meeting in over a year at the Mayflower hotel, Washington, D. C., Wednesday, June 26 to Friday, June 28. On account of some difficulty in arranging a trade practice conference under the auspices of the Federal Trade Commission at this time, announcement of the meeting was delayed. Nevertheless, because of the extreme importance of this meeting and conference to the lime industry it is expected that there will be a large attendance. A similar trade conference of the gypsum industry, held earlier in the year, was attended by producers of 98% of the gypsum mined in this country.

The official program of the meeting is as follows:

WEDNESDAY, JUNE 26, 1929
9:30 A. M.
OPEN MEETING OF ENTIRE LIME INDUSTRY TO CONSIDER RESOLUTIONS TO BE SUBMITTED AT THE TRADE PRACTICE CONFERENCE
Presiding—M. MARKHAM FLANNERY, *Director, Trade Practice Conference Division of the Federal Trade Commission*

THURSDAY, JUNE 27, 1929
9:30 A. M.
TRADE PRACTICE CONFERENCE
Presiding—HON. W. E. HUMPHREY, *Commissioner, Federal Trade Commission*

ELEVENTH ANNUAL MEETING
of the
NATIONAL LIME ASSOCIATION
Meeting will convene immediately upon adjournment of Trade Practice Conference and will be concluded by 5 p. m., Friday, June 28.

ORDER OF BUSINESS
Roll Call
Minutes of Tenth Annual Meeting Held in New York City, May 23, 24, 1928
Appointment of Committees
Reports of Directors Elected by Districts
Report of Treasurer
RALPH P. WILTON
Report of and Discussion by the Manager
NORMAN G. HOUGH
Recommended Revisions of Constitution and By-Laws

ADDRESS
Luncheon, Friday, June 28
BY
HON. NELSON B. GASKILL
Former Chairman, Federal Trade Commission
SUBJECT:
"The Clayton Act in Relation to Price Discrimination as Interpreted by the Supreme Court in the American Can Case."

PROGRAM OF ASSOCIATION ACTIVITIES FOR FISCAL YEAR OF 1929-30
Reports of Committees
Other Business
Adjournment

Norman G. Hough

This will be the first general meeting of the National Lime Association since Norman G. Hough was appointed manager. He took the office under about as discouraging conditions are ever faced an association manager. In the opinion of those most familiar with his work he has made notable progress against almost unsurmountable difficulties. His efforts are culminated in this meeting and trade practice conference.

Apathy toward a solution of their problems by a large number of producers in the lime industry prevented the last annual convention being attended by an adequate representation of the industry. Since then the lime industry has continued to take its punishment, not alone to be sure, but without any national effort to extricate itself from its difficulties, such as nearly every other industry under similar circumstances has availed itself of.

It is sincerely hoped by every well wisher of the lime industry that every manufacturer who hopes and expects to continue in business will be at the Washington meeting.

Another California Cement Project Rumored

NEGOTIATIONS are now under way between the Gillibrand family, owners of valuable mineral deposits on the Tapo Alto ranch north of Santa Susana, Calif., and a northern cement company, represented by J. L. McPherson, civil and mining engineer from Seattle, Wash., which if satisfactorily closed will mean the establishment of a cement manufacturing plant at Tapo Alto.

Mr. McPherson with a crew of 15 or 20 men is engaged in determining the feasibility of extending the spur branch of the Southern Pacific railroad at the Tapo Citrus Association, north to the site of the proposed plant.

The materials which will be used for the cement manufacture will come from the mineral deposits which are now being used for a chicken feed and soil sweetener.—*Ventura* (Calif.) *Star*.

United Feldspar Expands

THE UNITED FELDSPAR CORP. has acquired the capital stocks of the Tennessee Mineral Products Corp., Spruce Pine, N. C., the Oxford Mining and Milling Co., West Paris, Maine, the Perham Crystal Feldspar Mines of Oxford county, Maine, and the United States Feldspar Corp., Cranberry Creek, N. Y., thereby bringing under one head such well-known brands of feldspar as Minpro, Oxford Crystal, Cranberry and Kennyetto. Biospar crystals are also produced by this corporation. The Roessler and Hasslacher Chemical Co., 10 East 40th street, New York, N. Y., are sole sales agents for the products of the merger.

The corporation has begun the enlargement of one of its plants and has plans under way to double the capacity of the Maine plant and install an aerial tramway from the quarry to the mill. The New York office of the United Feldspar Corp. will be at 10 East 40th street.

Phosphate Rock in Brazil

A REPORT from Vice-Consul Wainwright, San Paulo, Brazil, states that phosphate rock has been found to exist in paying quantities in the interior of Brazil at Ipanema, Cabreuva and Cascaval.

Editorial Comment

The Lime Convention

Within a day or two after this issue is in the hands of most of its readers the National Lime Association will hold its annual meeting in Washington, D. C., June 26-27-28. Every lime producer should have received notice of this meeting, and an urgent invitation to attend. If any one has not received a notice of the meeting prior to reading this, he will find an invitation published elsewhere in this issue. And if our influence in the lime industry for the good of the lime industry amounts to anything, and we believe it amounts to a good deal, all that influence is urged on you to attend this meeting.

It will be the first opportunity that the present secretary and manager of the association has had to give an account of his activities for the past year—and he has done everything that one man can do to find out and straighten out some shortcomings in the industry—and to outline his diagnosis of the ills of the industry and his recommendations for their cure. He ought to have a full house.

On the second day of the meeting will be a conference of the industry with the Federal Trade Commission to discuss and draft a code of business practices which will go a long ways to eliminate some of the things that have held down the industry for several years past. The gypsum industry has already adopted such a code—an announcement which was followed immediately by an increase in the value of stocks in gypsum companies as quoted on various exchanges. Need any other argument be used to persuade lime manufacturers to help themselves in a similar way?

Cement Plants as Neighbors

In Los Angeles, Calif., there has been a fine row over a proposal to build the crushing end of a cement plant on a site famed for its natural beauty The promoter has promised that the buildings will not offend, that the operation will be dustless and so nearly noiseless that the nearest neighbor will not be offended. He proposes to transport the ground rock through a pipeline so that the neighborhood will not be disturbed by heavy trucking. All of which is possible, for there are cement plants that are dustless and noiseless and otherwise unobjectionable as neighbors.

But those opposed will not credit his statements nor hardly give them a decent hearing. It is their freely expressed opinion that *any* industrial plant will absolutely ruin the neighborhood and would do so even though it scattered the perfumes of Araby and was as beautiful as the Taj Mahal. In their minds, to label it "industrial" is to classify it with bawdy houses and dog pounds as an undesirable neighbor.

The feeling is a hangover from the days when Industry was a growing boy and struggling so hard to make a place for himself in the world that he often forgot to wash his hands and face and to change his overalls. Cultured people, who might have taught him better if they had appreciated his good qualities, raised their eyebrows and murmured something about "uncouth persons," and made him live over back of the tracks where he would not offend fastidious eyes, ears and noses. So it came about that the earlier industrial towns were dreadful places, dirty, unsanitary and altogether squalid. A few ambitious factory owners tried to improve matters by putting up buildings that looked like medieval castles, but that was not enough to take the curse off.

But Industry is growing up and is learning to appreciate appearances; the cement industry rather more than generally known. Several plants erected in the past two or three years are admitted by artists and architects to be really beautiful, and one must be blind indeed to the beauty of good proportion and line and form if he cannot get a thrill from seeing them. To pick a few examples from a great many, take the Lawrence plant at Thomaston, Maine, the Lehigh plant at Sandts Eddy, Penn., the Alpha's (Phoenix) plant at Birmingham, Ala., and the Trinity and Lone Star plants at Houston, Texas. These are by no means all but they are fair examples of what industrial plants ought to be in the light of our present knowledge of how to build them.

We are essentially an industrial people and we express ourselves in industrial building just as the people of the thirteenth century expressed themselves in cathedrals. Only industries really make a town, even a town like Los Angeles which brags of its oranges and spends enormous sums to attract tourists every year. Relentless figures show that of the city's income $100,000,000 came from oranges, $150,000,000 from tourists and $613,000,000 from industrial enterprises. Still among the people who live there are many who shudder at the thought of a closer contact with that which provides them with 71% of their income.

Industry is cleaning up and as old buildings become obsolete, well designed and well constructed buildings rise in their places. Something remains to be done in educating the public to the value of aesthetics, but more has to be done in teaching the public that industry and beauty are not enemies, that a fine factory is beautiful in the same way that a fine automobile is beautiful. They are good expressions of our modern industrial civilization and it is by our present works and not by the standards of those who worship the romantic and the picturesque that we are to be judged.

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

Stock	Date	Bid	Asked	Dividend
Allentown P. C. 1st 6's[29]	6-19-29	91	.....	
Alpha P. C. new com.	6-17-29	45	47	75c qu. July 15
Alpha P. C. pfd.	6-17-29	116	.....	1.75 qu. June 15
American Aggregates com.[29]	6-19-29	.....	44	75c qu. Mar. 1
Amer. Aggregate 6's, bonds	6-14-29	98	.....	
American Brick Co., sand-lime brick	6-17-29	13	14	25c qu. Feb. 1
American Brick Co. pfd., sand-lime brick	6-17-29	.....	83	50c qu. Feb. 1
Am. L. & S. 1st 7's[29]	6-19-29	96	97	
American Silica Corp. 6½'s[49]	6-19-29	96	100	
Arundel Corp. new com.	6-18-29	39½	40	50c qu. Apr. 1
Atlantic Gyp. Prod. (1st 6's & 10 sh. com.)[10]	6-19-29	70	80	
Atlas P. C. com.	6-17-29	47	50	50c qu. June 1
Beaver P. C. 1st 7's[20]	6-14-29	98	101	
Bessemer L. & C. Class A[4]	6-15-29	35	36½	75c qu. May 1
Bessemer L. & C. 1st 6½'s[4]	6-15-29	95½	97	
Bloomington Limestone 6's[29]	6-19-29	90	93	
Boston S. & G. new com.[18]	6-17-29	20	23	
Boston S. & G. new 7% pfd.[18]	6-17-29	48	50	
Canada Cement com.	6-17-29	26½	.....	
Canada Cement pfd.	6-17-29	96	96½	1.62½ qu. June 29
Canada Cement 5½'s[43]	6-14-29	99¼	99¾	
Canada Cr. St. Corp. 1st 6½'s[43]	6-14-29	98	101	
Canada Gyp. & Alabastine	6-17-29	106	107	75c July 2
Certainteed Prod. com.	6-18-29	25	25¼	
Certainteed Prod. pfd.	6-18-29	74	75⅛	1.75 qu. Jan. 1
Cleveland Quarries new st'k	6-18-29	69	70	50c & 25c ex. June 1 & 50c Sept. 1
Columbia S. & G. pfd.	6-17-29	89¾	92	
Consol. Cement 1st 6½'s, A[42]	6-19-29	92	95	
Consol. Cement 6½% notes[29]	6-19-29	78	83	
Consol. Cement pfd.[29]	6-19-29	50	60	
Consol. Oka S. & G. 6½'s[12] (Canada)	5-17-29	101	103	
Consol. Rock Prods. com.[18]	6-15-29	9½	.....	
Consol. Rock Prods. pfd.[18]	6-15-29	23	.....	
Consol. Rock Prods. units[18]	6-15-29	56	58	
Consol. S. & G. com. (Canada)	6-17-29	14	.....	
Consol. S. & G. pfd. (Canada)	6-17-29	86	89	1.75 qu. May 15
Construction Mat. com.	6-18-29	28⅞	29	
Construction Mat. pfd.	6-18-29	43¾	44	87½c qu. May 1
Consumers Rock & Gravel, 1st Mtg. 6's, 1948[18]	6-15-29	96	98½	
Coosa P. C. 1st 6's[29]	6-19-29	50	60	
Coplay Cem. Mfg. 1st 6's[40]	6-17-29	90	.....	
Coplay Cem. Mfg. com.[40]	6-17-29	15	.....	
Coplay Cem. Mfg. pfd.[40]	6-17-29	75	.....	
Dewey P. C. 6's[30] (1930-41)	6-19-29	98	.....	
Dewey P. C. 6's[30] (1942)	6-19-29	101	.....	
Dolese & Shepard	6-17-29	100	103	$2 qu. July 1
Edison P. C. com.[39]	6-17-29	10c	.....	
Edison P. C. pfd.[39]	6-17-29	25c	.....	
Giant P. C. com.[25]	6-17-29	35	40	
Giant P. C. pfd.[25]	6-17-29	35	40	3½% s.-a. June 15
Ideal Cement, new com.[33]	6-17-29	74	76	75c qu. Apr. 1
Ideal Cement 5's, 1943[33]	6-17-29	100	102	
Indiana Limestone units[29] (5 shs. com. & 1 sh. pfd.)	6-19-29	140	.....	
Indiana Limestone 6's	6-18-29	88¾	90	
International Cem. com.	6-18-29	84⅞	85	$1 qu. June 28
International Cem. bonds 5's	6-18-29	102¾	103	Semi-ann. int.
Iron City S. & G. bonds 6's[46]	6-13-29	93	95	
Kelley Is. L. & T. new st'k	6-18-29	55	.....	62½c qu. Apr. 1
Ky. Cons. Stone Co. com.[48]	6-13-29	13	14½	
Ky. Cons. St. com. Voting Trust Certif.[48]	6-13-29	13	14½	
Ky. Cons. Stone 6½'s*[48]	6-13-29	96	100	
Ky. Cons. St. Trustee Certif.[18] (1 Sh. 7% cum. pfd. & 1 sh. com. stock)	6-13-29	99	102	
Lawrence P. C.	6-17-29	92	96	2% qu. June 29
Lawrence P. C. 5½'s, 1942	6- 5-29	91	94	
Lehigh P. C.	6-18-29	52½	55	62½c qu. Aug. 1
Lehigh P. C. pfd.	6-18-29	109	109½	1¾% qu. July 1
Lyman-Richey 1st 6's, 1932[13]	6-17-29	98½	100	
Lyman-Richey 1st 6's, 1935[13]	6-17-29	97	99	
Marblehead Lime 6's[14]	6-14-29	98	100	
Material Service Corp.	6-19-29	29½	31	50c qu. June 1
Medusa Portland Cem.[29]	6- 5-29	124	128	
Mich. L. & C. com.[6]	6-17-29	35	.....	
Missouri P. C.	6-18-29	42	43	50c qu. May 1
Monolith Midwest[9]	6-13-29	8½	10	
Monolith bonds, 6's[9]	6-13-29	97	98	
Monolith P. C. com.[9]	6-13-29	14	14½	40c s.-a. July 1
Monolith P. C. pfd.[9]	6-13-29	9	9½	40c s.-a. July 1
Monolith P. C. units[9]	6-13-29	32	33½	
National Cem. (Can.) 1st 7's[38]	6-17-29	96	.....	
National Gypsum A com.	6-17-29	19	21	
National Gypsum pfd.	6-17-29	54	56	
Nazareth Cem. com.[26]	6-14-29	27	29	
Nazareth Cem. pfd.[26]	6-14-29	100	104	
Newaygo P. C. 1st 6½'s[29]	6-19-29	102	.....	
New Eng. Lime 1st 6's[14]	6-14-29	98	100	
N. Y. Trap Rock 1st 6's	6-18-29	97	.....	
North Amer. Cem. 1st 6½'s	6-18-29	70	.....	
North Amer. Cem. com.	6-14-29	9⅛	10	
North Amer. Cem. 7% pfd.	6-14-29	35	42	
North Amer. Cem. units[29]	6-19-29	35	45	
North Shore Mat. 1st 5's[15]	6-19-29	97	100	
Northwestern States P. C.[37]	6-14-29	125	.....	
Ohio River Sand 7% pfd.	6-17-29	100½	.....	
Ohio River S. & G. 6's[16]	6-17-29	92	96	
Pac. Coast Cem. 6's, A[5]	6-13-29	.....	95	
Pacific Lime Co. pfd.[11]	6-15-29	No market		
Pacific P. C. com.	6-14-29	22½	30	
Pacific P. C. pfd.	6-14-29	78	80	1.62½ qu. Jan. 5
Pacific P. C. 6's[5]	6-13-29	99¼	100	
Peerless Egyp'n P. C. com.[1]	6-14-29	2½	2⅞	
Peerless Egyp'n P. C. pfd.[1]	6-14-29	83	87	
Penn-Dixie Cem. 1st 6's	6-18-29	85½	.....	
Penn-Dixie Cem. pfd.	6-18-29	55	60	1.75 qu. June 15
Penn-Dixie Cem. com.	6-18-29	15½	16	
Penn. Glass Sand Corp. 1st 6's, 1952†	6- 5-29	98	100	
Penn. Glass Sand pfd.	6- 5-29	108	.....	
Petoskey P. C.	6-18-29	10	10¾	1½% qu.
Riverside P. C. com.[5]	6-13-29	18	20	
Riverside P. C. pfd.[5]	6-13-29	90	93	1.50 qu. May 1
Riverside P. C., A[20]	6-14-29	.....	21	31¼c qu. May 1
Riverside P. C., B[44]	6-13-29	5	6½	
Santa Cruz P. C. bonds	6-14-29	105¾	.....	6% annual
Santa Cruz P. C. com.	6-14-29	91	.....	$1 qu. Apr. 1
Schumacher Wallboard com.	6-14-29	14¾	15	
Schumacher Wallboard pfd.	6-14-29	23½	25	
Southwestern P. C. units[44]	6-13-29	270	.....	
Standard Paving & Mat. (Can.) com.	6-17-29	31½	32¾	50c qu. May 15
Standard Paving & Mat. (Can.) pfd.	6-17-29	96	.....	1.75 qu. May 15
Superior P. C., A[20]	6-14-29	41½	43	27½c mo. Mar. 1
Superior P. C., B[20]	6-14-29	25¾	30	
Trinity P. C. units[37]	6-14-29	130	140	
Trinity P. C. com.[37]	6-14-29	40	.....	
Trinity P. C. pfd.[20]	6-19-29	110	.....	
U. S. Gypsum com.	6-18-29	70	70½	2% qu. June 30
U. S. Gypsum pt. paid	6-18-29	62	.....	
U. S. Gypsum pfd.	6-19-29	124	126	1¾% qu. June 30
Universal G. & L. com.[3]	6-19-29	.....	1	
Universal G. & L. pfd.[3]	6-19-29	.....	10	
Universal G. & L., V.T.C.[3]	6-19-29	No market		
Universal G. & L. 1st 6's[3]	6-19-29	.....	60	
Warner Co. com.[16]	6-17-29	35	38	50c qu. July 15
Warner Co. pfd.[16]	6-17-29	96	99	1¾% qu. July 1
Warner Co. 1st 6's[5]	6-19-29	98¾	99	
Whitehall Cem. Mfg. com.[36]	6-17-29	150	.....	
Whitehall Cem. Mfg. pfd.[36]	6-17-29	98	.....	
Wisconsin L. & C. 1st 6's[15]	6-19-29	98	101	
Wolverine P. C. com.	6-17-29	6	6½	15c qu. May 15
Yosemite P. C., A com.[20]	6-14-29	4¼	4¾	

*Ann. interest due May and Nov. 1. Semi-ann. coupon of $32.50 paid Nov. 1. †Called for redemption at 105, July 1.

[1]Quotations by Watling Lerchen & Hayes Co., Detroit, Mich. [2]Quotations by Bristol & Willett, New York. [3]Quotations by Rogers, Tracy Co., Chicago. [4]Quotations by Butler Beadling & Co., Youngstown, Ohio. [5]Quotations by Freeman, Smith & Camp Co., San Francisco, Calif. [6]Quotations by Frederic H. Hatch & Co., New York. [7]Quotations by F. M. Zeiler & Co., Chicago, Ill. [8]Quotations by Dillon, Read & Co., Chicago, Ill. [9]Quotations by A. E. White Co., San Francisco, Calif. [10]Quotations by Lee Higginson & Co., Boston and Chicago. [11]Nesbit, Thomson & Co., Montreal, Canada. [12]James Richardson & Sons, Ltd., Winnipeg, Man. [13]Peters Trust Co., Omaha, Neb. [14]First Wisconsin Co., Milwaukee, Wis. [15]Central Trust Co., of Illinois, Chicago. [16]J. S. Wilson, Jr., Co., Baltimore, Md. [17]Chas. W. Scranton & Co., New Haven, Conn. [18]Dean, Witter & Co., Los Angeles, Calif. [19]Hoit, Rose & Troster, New York. [20]Quotations by Bond & Goodwin & Tucker, Inc., San Francisco. [21]Baker, Simonds & Co., Inc., Detroit. [22]Pirnie, Simons and Co., Springfield, Mass. [23]Blair & Co., New York and Chicago. [24]A. B. Leach & Co., Inc., Chicago. [25]Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [27]J. G. White & Co., New York. [28]Mitchell-Hutchins Co., Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago. [31]McIntyre & Co., New York, N. Y. [32]Hepburn & Co., New York. [33]Boettcher, Newton & Co., Denver, Colo. [34]Kidder, Peabody & Co., Boston, Mass. [35]Farnum, Winter & Co., Chicago. [36]Hanson and Hanson, New York. [37]S. F. Holzinger & Co., Milwaukee, Wis. [38]McFetrick & Co., Montreal Que. [39]Tobey and Kirk, New York. [40]Steiner, Rouse and Stroock, New York. [41]Hornblower & Weeks, New York City and Chicago. [42]E. H. Rollins, Chicago, Ill. [43]Jones, Heward & Co., Montreal, Que. [44]Tenney, Williams & Co., Inc., Los Angeles, Calif. [45]Taylor Ewart & Co. [46]Stein Bros. & Boyce, Baltimore, Md. [47]Bank of Pittsburgh, Pittsburgh, Pa. [48]E. W. Hays & Co., Louisville, Ky. [49]Blythe Witter & Co.

INACTIVE ROCK PRODUCTS SECURITIES (Latest Available Quotations)

Stock	Price bid	Price asked
American Brick Co. pfd. (sand-lime brick) 16 sh.[6]	par 25	25¾
American Brick Co. pfd., 5 sh.[2] (par 25)	25	.....
Atlantic Gypsum Products[6] com., 200 shares	$2 per share	.....
International Portland Cement Co., Ltd., pfd.	30	45
Knickerbocker Lime Co.[4]	105	.....
Seaboard P. C.[1] 6% bonds ($7,500) 7-1-27. July, 1910, and subsequent coupons attached	$10 for the lot	.....
Southern Phosphate Co.[6]	1¼	.....
Universal Gypsum com. free stk.[1] 300 shares	$75 for the lot	.....
Universal Gypsum com.[1] 153 shares (no par)	$51 for the lot	.....
Vermont Milling Products Co. (slate granules), 22 sh. com. and 12 sh. pfd.[6]	$1 for the lot	.....
Winchester Brick Co., pfd., sand lime brick[5]	10c	.....
Winchester Rock Brick Co., pfd., 1 share (par $25) and 1 share com. (par $10)[6]	$8 for the lot	.....

[1]Price obtained at auction by Adrian H. Muller & Sons, New York. [2]Price at auction by R. L. Day & Co., April 24, 1929. [4]Price obtained at auction by Barnes and Lofland, Philadelphia, on April 4, 1928. [5]Price obtained at auction for lot of 50 shares by R. L. Day & Co., Boston, Mass. [6]Price obtained at auction by Wise Hobbs and Arnold, Boston, Mass.

Annual Report of Canada Cement Co., Ltd.

EXTRACTS of the annual report of A. C. Tagge, president of the Canada Cement Co., Ltd., for the fiscal year ending November 30, 1928, follow:

The generally prosperous business conditions that have prevailed throughout Canada during the past year have brought about a better demand for cement, and sales of the company's product showed some increase in all districts. The largest increase was in western Canada, and this increase enabled the company to make a substantial reduction in western prices during the year. This is in line with the policy of reducing prices when volume of business and economies in operation make it possible to do so.

The export business did not show the increase that had been hoped for. It is becoming more and more difficult to compete with the low labor costs and low freight rates of European competitors, and export shipments have remained practically stationary for the past three years.

During the year the company has disposed of its holdings in the securities of the Consumers Glass Co., Ltd. Its interests in the Pennsylvania Gypsum Co. at Chester, Penn., were also disposed of to the Atlantic Gypsum Products Corp. of Portsmouth, N. H., with which an arrangement was made for supply of the raw gypsum rock required by the eastern plants. This rock comes from quarries in Nova Scotia operated by that company for the supply of rock for its own requirements. While this arrangement is in force the Canada Cement Co.'s deposits of gypsum in Nova Scotia will not be operated, but will be held in reserve for the future.

Owing to the difficulty of draining the pit supplying clay for the Winnipeg plant and the expense of handling and drying the very wet clay, it was decided to change that plant from dry to wet process. This change was carried out during the winter of 1927 and 1928, and the plant was put into operation on wet process last June. Improved operating conditions and increased efficiency have amply justified the change.

Additional clay properties were purchased by our Belleville plant, which will provide the clay requirements for that plant for many years to come.

It is believed that the results of the company's prevention work, and the fact that more than 50% of the employes are shareholders in the company, through the employes' stock distribution plan, are largely responsible for increased labor efficiency, and as employes will continue to benefit in the future by a continuance of safety work and by further opportunities to purchase stock through the employes' stock distribution plan, it is confidently expected that operating efficiency will continue to improve as it has in the past.

CANADA CEMENT CO., LTD., BALANCE SHEET, NOVEMBER 30, 1928

ASSETS

Current assets:			
Inventories		$ 2,924,050.53	
Accounts receivable (less bad debts reserve):			
Customers' accounts and bills receivable	$864,137.87		
Other accounts	105,172.91		
		969,310.78	
Deposits on tenders		77,211.94	
Call loans		750,000.00	
Cash		817,230.53	
			$ 5,537,803.78
Deferred charges to operations			121,825.20
Investments:			
In the St. Lawrence Land Co. (owning the Canada Cement Building and other properties) and other investments			4,727,651.20
Cost of properties: Land, buildings, plant, equipment, etc., less depreciation			39,044,696.58
			$49,431,976.76

LIABILITIES

Current liabilities:			
Accounts payable		$ 954,383.73	
Bond interest accrued and unpresented coupons		122,546.66	
Preference dividend No. 4, payable December 31, 1928		341,241.43	
			$ 1,418,171.82
Reserves:			
Fire insurance		$ 152,949.81	
Extraordinary repairs and renewals		25,000.00	
Cloth sacks outstanding		150,000.00	
Industrial accidents		20,000.00	
Contingent reserve (a portion of which is available for government taxes)		230,000.00	
Preference stock sinking fund		2,076.77	
			580,026.58
First mortgage sinking fund gold bonds, 5½%, Series "A," due 1947:			
Authorized		$30,000,000.00	
Issued			20,000,000.00
Preference stock, 6½% sinking fund cumulative:			
Authorized		$25,000,000.00	
Issued			21,000,000.00
Common stock and surplus:			
Surplus balance, November 30, 1927		$ 6,403,904.75	
Profit and loss account:			
Profits from operation for the year ending November 30, 1928, after making provision of $1,598,873.60 for depreciation and capital assets	$ 3,074,900.19		
Deduct:			
Bond interest	$1,100,000.00		
Fire insurance reserve	152,949.81		
Reserve for extraordinary repairs and renewals	25,000.00		
Reserve for cloth sacks outstanding	150,000.00		
Reserve for industrial accidents	20,000.00		
Contingent reserve (for taxes, etc.)	230,000.00		
Preference stock sinking fund	2,076.77		
	1,680,026.58		
	$ 1,394,873.61		
Deduct: Dividends on preferred stock	1,365,000.00		
		29,873.61	
A total of			6,433,778.36
			$49,431,976.76

represented by 600,000 shares of no par value common stock out of an authorized issue of 750,000 shares.

Annual Report of North American Cement

FOLLOWING ARE EXTRACTS from the annual report of F. W. Kelley, president of the North American Cement Corp., to its stockholders:

Shipments of portland cement from American mills in the territory which this company's plants serve, as given by the United States Bureau of Mines, were 2.7% less in 1928 than in 1927. Shipments followed this decrease very closely. Selling prices which dropped sharply in 1927 recorded a further decrease in 1928, due to the continued pressure of foreign cement and our efforts to hold our markets.

The effect of the reductions in volume of business and in selling price has been partly offset by lower manufacturing costs. These lower costs reflect the savings from the waste-heat boilers and power plant at Security, the more efficient utilization of steam by the new turbine at Howes Cave and changes in all plants to secure greater efficiency. A large part

INCOME ACCOUNT FOR THE YEAR ENDED DECEMBER 31, 1928, NORTH AMERICAN CEMENT CORP.

Net sales		$5,538,741.29
Cost of sales, exclusive of depreciation and depletion		3,263,562.87
Gross profit		$2,275,178.42
Selling and other expenses		895,678.52
Net profit		$1,379,499.90
Miscellaneous earnings		$ 36,023.55
Gross earnings		$1,415,523.45
Interest and amortization expenses on bonds	$562,247.14	
Depreciation and depletion	672,175.37	
		1,234,422.51
Net income		$ 181,100.94

SURPLUS ACCOUNT

Initial and earned surplus, December 31, 1927		$1,814,671.65
Net income for the year 1928		181,100.94
		$1,995,772.59
Deduct:		
Minor adjustments	$ 578.48	
Obsolete power plant machinery replaced by modern equipment	295,295.47	
Dividends on preferred stock	90,125.00	
		385,998.95
Initial and earned surplus, December 31, 1928		$1,609,773.64

BALANCE SHEET OF THE NORTH AMERICAN CEMENT CORP. (DECEMBER 31, 1928)

ASSETS		
Current:		
Cash		$ 359,888.39
Notes and trade acceptances receivable	$ 42,880.13	
Accounts receivable	434,396.92	
	$ 477,277.05	
Less allowance for doubtful accounts	34,666.16	442,610.89
Inventories, at the lower of cost or market		966,296.79
Total current assets		$ 1,768,796.07
Real estate, buildings, equipment and stone deposits	$15,764,251.49*	
Less allowance for depreciation and depletion	1,817,510.74	13,946,740.75
Treasury stock and investments, at cost		27,015.00
Sinking fund		584.11
Deferred charges		715,812.92
		$16,458,948.85

*Commercial value of properties acquired at organization in 1925 as appraised by Ford, Bacon and Davis, Inc., with subsequent acquisitions and additions at cost.

LIABILITIES		
Current:		
Notes payable		$ 48,129.00
Accounts payable ($240,000 payable at rate of $20,000 per month)		310,825.86
Accrued interest, wages, etc.		206,616.23
Total current liabilities		$ 565,571.09
Amount due for plant additions, payable $20,000 per month after December 31, 1929		294,663.10
First mortgage 6% bonds, due August 20, 1935, Acme		287,000.00
Sinking fund gold debentures, Series A, 6½%, due September 1, 1940		7,079,500.00
Reserves, insurance and accident, etc.		59,941.02
		$ 8,286,675.21
CAPITAL		
Preferred stock, 7% cumulative $100 par value, authorized 100,000 shares, issued 51,500 shares (dividends paid to August 1, 1927, and a dividend of $1.75 per share paid August 1, 1928)	$5,150,000.00	
Common stock, no par value, authorized 350,000 shares, issued 133,250 shares	1,412,500.00	
Initial and earned surplus	1,609,773.64	8,172,273.64
		$16,458,948.85

of the new equipment has only been available during the latter half of the year.

Foreign cement free of duty has continued to come into the territory which these plants serve, in large volume, taking in some places a high percentage of the total consumption and affecting to a marked degree all the markets within our reach.

Wolverine Portland Cement Statement for 1928

THE 27th annual report of the Wolverine Portland Cement Co., Coldwater, Mich., for the fiscal year ending December 31, 1928, contains the following statements concerning the operation, selling and administrative costs as well as the balance sheet:

CONDENSED OPERATING STATEMENT OF THE WOLVERINE PORTLAND CEMENT CO. (December 31, 1928)

Net sales	$ 881,465.38	
Cost of goods sold (exclusive of depreciation and depletion)	683,032.92	
Gross profit (exclusive of depreciation and depletion)		$ 198,432.46
Depreciation	$ 75,621.23	
Depletion	8,149.69	
Total depreciation and depletion		83,770.92
Gross profit		$ 114,661.54
Sell expenses	$ 43,589.93	
Administrative expenses	22,662.10	
Total expenses		66,252.03
Operating profit		$ 48,409.51
Plus: Non-operating revenue (net)		9,451.16
		$ 57,860.67
Less: Provision for income tax		6,830.08
Net profit for year		$ 51,030.59

SURPLUS ACCOUNT	
Balance, January 1, 1928	$ 183,801.73
Plus: Net profit for year as above	51,030.59
	$234,832.32
Less: Cash dividends paid	60,000.00
Balance, December 31, 1928	$ 174,832.32

CONDENSED BALANCE SHEET OF THE WOLVERINE PORTLAND CEMENT CO. (December 31, 1928)

ASSETS			
Current assets:			
Cash		$ 299,888.17	
U. S. Treasury certificates		20,000.00	
Marketable bonds (at cost)		52,950.00	
Receivables		22,219.65	
Inventories		295,437.62	
Total current assets			$ 690,495.44
Fixed assets:			
Land, clay and marl deposits	$ 149,393.95		
Less: Reserve for depletion	73,260.69	76,133.26	
Plant and equipment	$1,220,000.00		
Less: Reserve for depreciation	740,753.14	479,246.86	
Total fixed assets			555,380.12
Deferred and other assets			2,922.79
Total assets			$1,248,798.35
LIABILITIES AND CAPITAL			
Current liabilities:			
Accounts payable		$ 27,135.95	
Provision for income taxes		6,830.08	
Total liabilities			$ 33,966.03
Capital:			
Capital stock outstanding		$1,000,000.00	
Surplus		174,832.32	
Fire insurance reserve		40,000.00	
Total capital			$1,214,832.32
Total liabilities and capital			$1,248,798.35

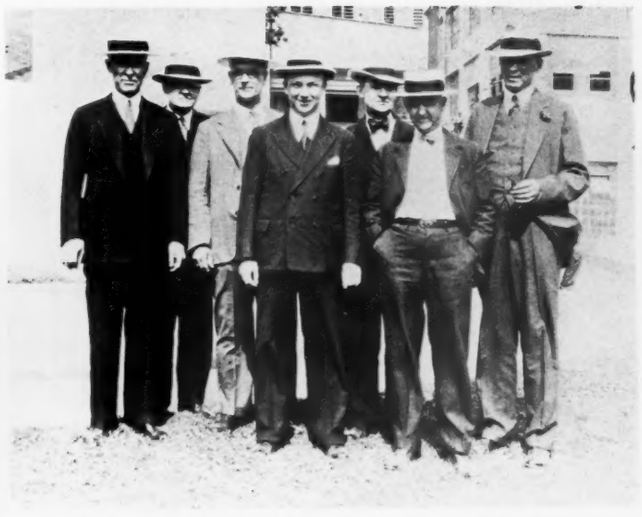
Plans Perfected for Merger of San Francisco Gravel Producers

PACIFIC COAST AGGREGATES, INC., San Francisco, Calif., formerly known as Pacific Aggregates, Inc., which was formed several months ago to consolidate 16 rock, gravel and fuel companies of California, including Pratt Rock and Gravel Co., Pratt Building Material Co., California Building Material Co., Acme Gravel Co., American River Sand and Gravel Co. and California Rock Co., is authorized by the state corporation commission to reclassify its stock and provide for various conversions. Original capitalization was 300,000 shares of class A and 900,000 shares of class B stock.

Under reclassification the company's capitalization will consist of 400,000 shares of no par value preferred and 565,000 shares no par common. The company is authorized to issue 20 convertible preferred shares to class A stockholders for same number outstanding and to issue 200,000 shares of convertible preferred to holders of first mortgage 6½% bonds as bond brokers convert the bonds, also to issue 60,000 shares convertible of preferred and 15,000 shares of common to holders of 10 years 7% convertible debentures and 380,020 shares of common to holders of convertible preferred. This issue of common will take care of all preferred stock to be issued in exchange for various companies acquired and all preferred stock into which bonds or debentures may be converted.

The permit provides that debenture holders have the option of purchasing units of four shares of preferred and one share of common at $100 instead of converting their debentures.

Appraisals at time of consolidation indicated that total properties of merged companies operating in the San Francisco district, approximated $23,000,000.—*Oakland* (Calif.) *Tribune.*



Left—A. J. R. Curtis addressing the assemblage at Ironton. Right—Speakers and guests at the celebration. Left to right: C. A. Irvin, vice-president, Alpha company; Henry McClarnan, general superintendent, Alpha company; Thomas G. Kearns, superintendent, safety department, Ohio Industrial Commission; A. J. R. Curtis, assistant to general manager, Portland Cement Association; Dr. George C. Hunter, Ironton plant surgeon; James R. Paul, district sales manager, Alpha company, and G. S. Brown, president, Alpha company

Ironton Plant Rededicates Safety Trophy

Alpha Mill Celebrates No Accidents Since December, 1928

IRONTON, OHIO, celebrated another red letter day in its history on Wednesday, June 5, when the plant of the Alpha Portland Cement Co. at that point celebrated freedom from accidents during 1928 by rededicating the Portland Cement Association safety trophy which it won for a perfect safety record in 1927.

Among the out-of-town visitors who journeyed to Ironton for the occasion were Gabriel S. Brown, president of the Alpha company, who came from Easton, Pa., Charles A. Irvin, vice president, from Chicago, Henry McClarnan, general superintendent, from La Salle, Ill., Thomas P. Kearns, superintendent of the department of safety of the Ohio Industrial Commission of Columbus, and A. J. R. Curtis of Chicago representing the Portland Cement Association.

A Family Party

Superintendent F. C. Brownstead turned over the management of the occasion to W. W. Hamilton, formerly plant engineer and recently appointed head of the Alpha safety work. The ceremonies were held on the lawn in front of the mill where the workers and their families and friends had assembled. In contrast to the great public gathering on the occasion of the first trophy dedication, the asemblage on June 5 was planned to be more of a great family party.

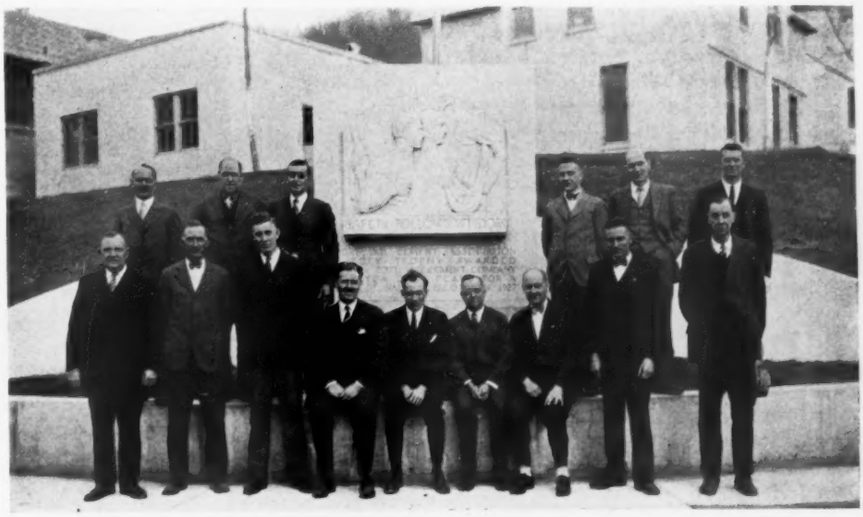
After briefly stating the purpose of the occasion, Mr. Hamilton called upon Rev. A. S. Morgan, secretary of the Ironton Y. M. C. A., who made the invocation. Mr. Hamilton then introduced A. J. R. Curtis, assistant to general manager, Portland Cement Association, who spoke on behalf of the industry. Mr. Curtis said in part:

"We are here today to celebrate an achievement unique in the annals of the portland cement industry.

"Your mill here in Ironton, with others at Cowell, California, and Iola, Kansas, are the first in America to work two consecutive calendar years without a lost time accident. Only a year or two ago such a record was inconceivable; it remained for your organization, through excellent team work and self-control, to accomplish something which heretofore had been regarded as impossible."

Mr. Curtis, after extending congratulations, continued:

"The cement mill is undoubtedly one of



Ironton plant safety committee. Lower row, left to right: F. C. Brownstead, John Dole, C. E. Whitlach, J. S. Beddall, W. W. Hamilton, W. L. Patterson, Dr. G. G. Hunter, Henry Hafle and A. C. Manis. Upper row, left to right: Dan Handley, Delbert Huddle, Oscar Taylor, A. A. Madden, Arthur McCarley and Wm. Butler

C. A. Irwin, vice-president in charge of western division, Alpha company bringing greetings to the gathering

the principal sources of the good things which this community enjoys and we are most grateful that it has been able, through the encouragement which the officials and citizens have given, to provide its blessings without sorrow or loss to a worker or citizen for well over two years.

"The governor and officials of this Buckeye state, represented today by Mr. Kearns, have been most helpful, I am sure, and hearily join in this occasion for rejoicing."

In response to Mr. Curtis' felicitations and in bringing to the workmen of the Ironton plant the congratulations of the Alpha officials at Easton, Mr. Brown said:

"A year ago when we gathered here to dedicate this trophy I experienced a deep sense of pride in this organization which naturally followed the feeling of envy when others had previously won trophies and we could not. Sometimes some of us doubted that an absolutely clear record could be made. But we know now that it can be done and I congratulate you men who have done it.

"A year ago I expressed the hope that I could come back here again this year, and here I am. Now I am hoping to come back for similar occasions in 1930, 1931 and for many years."

Safety Spirit Brings Rewards

Charles A. Irvin, vice-president in charge of the western division of the Alpha company was introduced and brought greetings from the official family at Chicago and the operating personnel of the western mills. Mr. Irvin then continued:

"It is our aim and desire to surround our employes with the highest safety factor, but a record such as you have established here at this plant cannot be accomplished without the hearty co-operation of each employe. In this great cause it is team work that counts. I can assure you gentlemen that there is nothing more depressing to the officers of the company than to be advised that an employe has been injured or killed.

"I want to congratulate you upon establishing such a remarkable record, and you have my best wishes for a continuance of your accomplishments."

Dr. George G. Hunter who has acted as mill surgeon for the Ironton plant for a number of years spoke very interestingly of the decline in injuries there. Dr. Hunter told the assemblage that he and the undertaker had been abjectly idle for the past two years—about the only people around Ironton so situated. Dr. Hunter stated that he hadn't earned his salt at the cement plant for the last year but wasn't in the least dejected nor did he expect to see old times and conditions return. Dr. Hunter laid progress to the remarkable safety spirit that has taken hold of the men.

As the closing speaker of the day, Mr. Hamilton introduced Hon. Thomas P. Kearns who spoke in part as follows:

"One year ago I was here on a similar occasion and at that time expressed the hope that I would have the pleasure of coming again this year to help celebrate another clear record for 1928 and that wish has been gratified. I am here again to assist the company officials, the employes, and the citizens of Ironton celebrate this remarkable record of two years without a lost time accident. That it should be reserved for an Ironton industry to bring about this remarkable achievement in the safety movement is not surprising. Your community is rich in industrial tradition. . . . .

F. C. Brownstead, superintendent, Ironton plant

G. S. Brown, president, Alpha Portland Cement Co.

"You have made brilliant contributions to statesmanship and public service, on the rostrum and in the forum, in the marts of commerce and in the fields of industry, and now you have symbolized your progressive spirit and rigidity of purpose by setting a shining example in the campaign for industrial safety, a movement yet in its infancy but destined to play an important part in the future of this remarkable industrial era upon which we have entered.

"Whatever you have attempted to do, you have done well and it should be a source of gratification to every employe of this plant and every citizen of Ironton and Lawrence County, as it is to the Industrial Commission of Ohio and its Division of Safety and Hygiene which I represent, that the honor of standing out as you have in a great humanitarian and economic movement has come to your community.

"To operate an industrial establishment with employes for a period of two years without a lost time accident is a remarkable achievement. One that any company can be justly proud of.

"It must be immensely gratifying, yet inspiring, to the officials of this company, as well as the employes, to know that they have been responsible for such a magnificent record. . . . . It is eminently fitting that we celebrate the achievement and I want to take this opportunity to congratulate the company officials on the success of their efforts and the great humanitarian spirit which prompted their interest in the safety movement.

"I also want to congratulate the very efficient and affable superintendent, Mr. Bownstead, who has worked so earnestly and faithfully to make safety a reality in this plant, to whom much of the credit for the success of the campaign is due. I also want to commend the workers who always play an important part in the success of a safety campaign. In fact no safety program could be made successful without their whole-hearted support and cooperation. And in consideration of those who have contributed to the success of this campaign.

"The remarkable records this company has made will not end here but will stand out as a beacon light for the rest of the country. . . . . You have furnished an inspirational safety topic that will be of invaluable assistance in stimulating the safety movement throughout the entire country."

At the close of the program, dinner was served to the workmen and their families and guests at the Sydenstricker Methodist Church, where places were waiting for 600.

Bellevue Dedicates Safety Trophy

A VERY large part of the town of Bellevue, Mich., went on a holiday Wednesday, June 12, in celebration of the unveiling of the Portland Cement Association safety trophy recently awarded to the Alpha Portland Cement Company's plant located there.

The town was reminded early of the impending festivities when the Alpha mill, which is the principal local industry, closed down for 24 hours. By ten o'clock the Kellogg Band of Battle Creek had arrived and

C. H. Denman, chief chemist, Bellevue plant

provided a musical treat which attracted local citizens and their families to the plant park well in advance of the eleven o'clock hour set for the ceremonies. Boy and Girl Scout organizations and the entire public school enrollment of Bellevue marched to the plant and were accorded places on the lawn directly before the big trophy.

Superintendent G. A. Lawniczak called the crowd to order from the flag-decked grand stand and called upon Reverend G. S. Chase to make the invocation. Mr. Lawniczak then called upon A. J. R. Curtis, who formally turned the trophy over to the plant organization, on behalf of the presentors. The trophy was then unveiled as the band played "Star Spangled Banner" and Superintendent Lawniczak accepted it gratefully.

Safety committee, Alpha Portland Cement Co., Bellevue, Mich. First row: C. H. Denman, Clarence Haughn. Second row: Albert Toutant, Ignacz Pajor, P. G. Pellegrom, Edward Simcox, Frank Manney, Harold Vogt. Third row: G. A. Lawniczak, Ward Irvin, Floyd Davidson, Fred Timmons, August Gillett, Ernest Barker, Burt Stoddard, Charles Scott

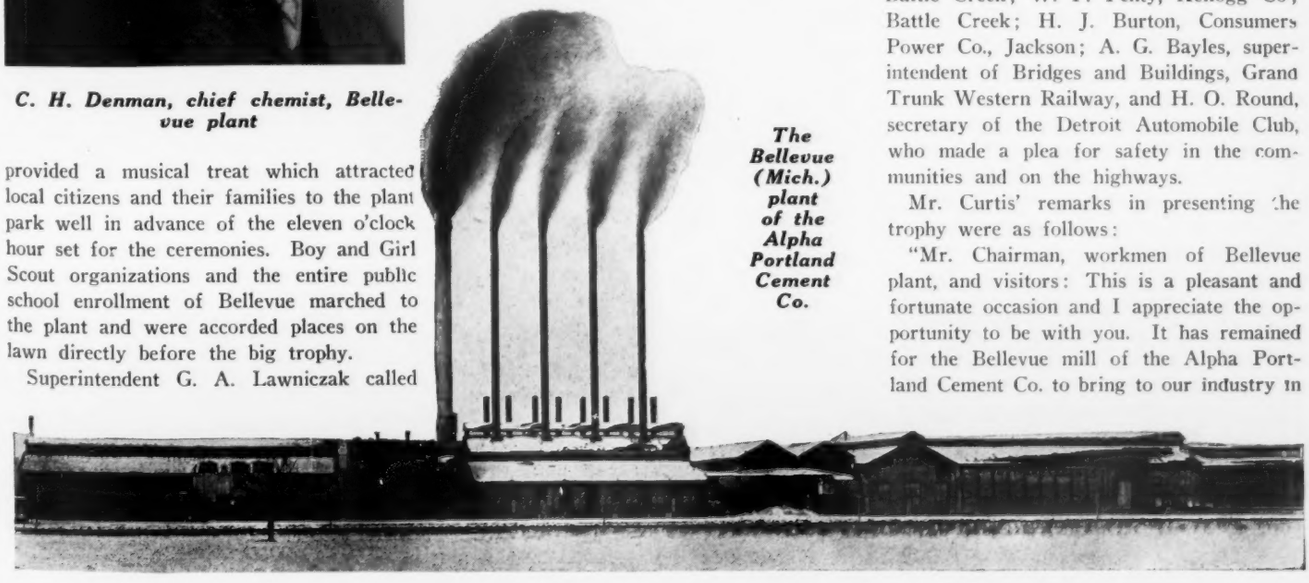
President Brown Addresses "Fellow-Workmen"

President G. S. Brown of the Alpha Portland Cement Co. then spoke, addressing his remarks to his "fellow workmen" and told them that it was a most pleasant duty to visit Bellevue for such an occasion after waiting so many years during which he attended the trophy dedications of other companies with envious heart. He exhorted the Bellevue organization to keep up the good record, first for their own protection and benefit and second for that of their company.

Other speakers included Charles A. Irvin, vice-president of the Alpha Company, Chicago; V. E. Sutton, Postum Cereal Co., Battle Creek; W. P. Penty, Kellogg Co, Battle Creek; H. J. Burton, Consumers Power Co., Jackson; A. G. Bayles, superintendent of Bridges and Buildings, Grand Trunk Western Railway, and H. O. Round, secretary of the Detroit Automobile Club, who made a plea for safety in the communities and on the highways.

Mr. Curtis' remarks in presenting the trophy were as follows:

"Mr. Chairman, workmen of Bellevue plant, and visitors: This is a pleasant and fortunate occasion and I appreciate the opportunity to be with you. It has remained for the Bellevue mill of the Alpha Portland Cement Co. to bring to our industry in



The Bellevue (Mich.) plant of the Alpha Portland Cement Co.

the great state of Michigan the distinguished honor of a perfect safety record for an entire year.

"Although Michigan has been well up in the forefront of cement producing states and has contributed a long list of men who have risen to positions of highest honor and authority in our industry; although its mill operators have been progressive and possessed of intelligence above the average, no Michigan mill was able to work a year without a lost time accident until 1928 when the plants at Bellevue and Quincy accomplished that enviable result.

"Therefore, it is my privilege, acting no authority of the board of directors and on behalf of the members of the Portland Cement Association throughout America, to turn over to you the Portland Cement Association safety trophy for 1928 and with it congratulations and best wishes to every member of your organization who has contributed to your splendid record. In presenting you with this trophy it is the hope of the Association that you may repeat this splendid record often during years to come.

"The need for safe thinking is perpetual and no season, month, day or instant is free from the possibility of injury unless every man in the organization is constantly on the alert. We sincerely hope that this concrete monument bearing new inscriptions for future perfect records will serve as a constant inspiration and reminder."

After the ceremonies the assemblage including visitors and school children went by auto to Pine Lake, six miles distant, where picnic lunch was served and refreshments provided throughout the afternoon. A program of contests and athletic events was staged after which there was a dancing party.

G. A. Lawniczak, superintendent, Bellevue plant

Mildred Plant Makes Enviable Record

THE FORMAL dedication on May 30 of the Portland Cement Association trophy for 1928 at the Mildred (Kans.) plant of the Consolidated Cement Corp. recalls the unusual progress made in the elimination of accidents at that plant during recent years.

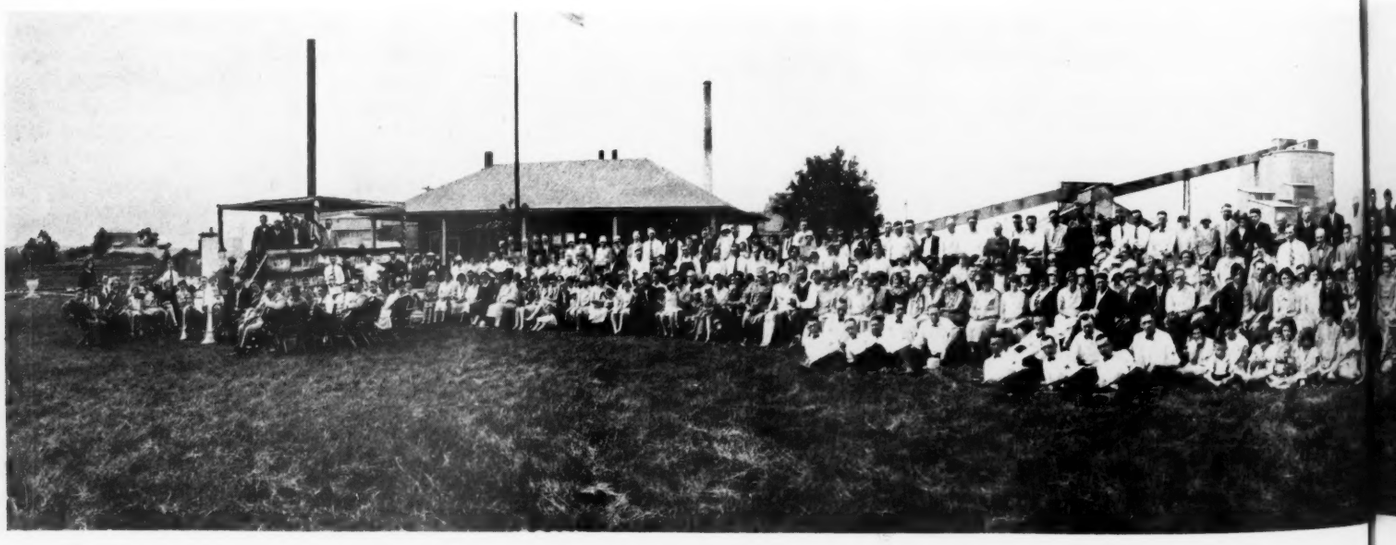
The accompanying table showing the number of accidents by departments during the past five years is probably as interesting a plant record as can be found anywhere. In 1924 this plant, then operated by the Great Western Portland Cement Co., suffered 41 lost time accidents, two of which terminated fatally. At this time the average annual number of accidents per plant for the industry was 29.9, showing that Mildred was much inferior to the average plant in respect to its accident record.

In 1925 there were even more accidents at Mildred than during the preceding year, although the severity had begun to decline and the loss was only 9.4 days per accident as against 15.9 days per accident in 1924.

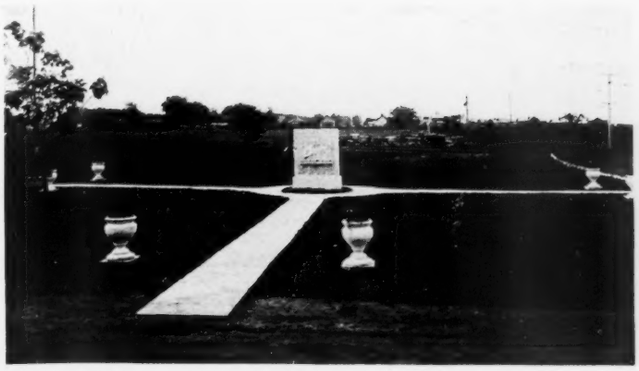
R. M. Johnson, district superintendent, Consolidated Cement Corp.

Whereas there were two fatal accidents at the plant in 1924 this record was reduced to one fatal accident in 1925.

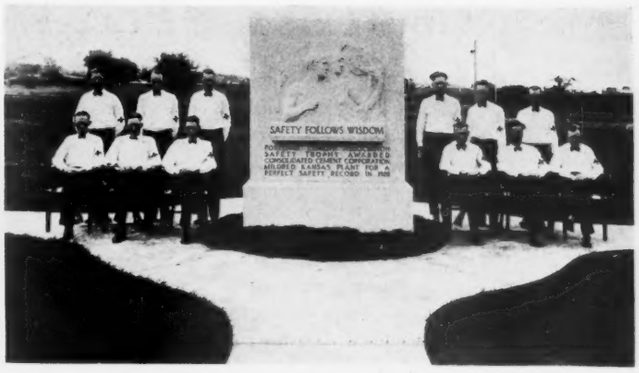
Much more definite improvement was noted in 1926, the year in which Mildred plant was taken over by the Consolidated



Part of the large crowd which gathered for the Memorial Day unveiling



The safety trophy installed at the Mildred plant



Safety committee of the Mildred plant

Cement Corp. Lost time accidents were reduced to one-half the number suffered during the preceding year. Fatal accidents were entirely eliminated and there have been no fatal accidents in the plant since December 26, 1925. The accident frequency was still high as compared with that in many other mills as indicated by the average of 17.9 accidents per mill during that year. As a result, the Consolidated operating department undertook a concentrated drive to reduce the accident rate.

This organization was led by James E. Curtis, general superintendent; R. M. Johnson, district superintendent; C. E. Caron, superintendent, and E. L. Drury, assistant superintendent, who embarked on an immediate program of safety education. The idea appealed to the men so strongly that notwithstanding the increased hazard of a very considerable amount of construction work then undertaken, the record for 1927 showed only one accident, which happened to a yard man with the loss of only five days' time. The mill departments, the packing and shipping crews and the quarry organization had come through almost literally without a scratch. In 1927, when the accident record for the entire industry showed an average of 10 lost time mishaps per mill, Mildred was celebrating a year with but one accident.

The same tactics continued during 1928, with even greater effectiveness, brought a perfect record for the year and the award of the Association trophy. Early in 1929 Superintendent Caron was promoted to the superintendency of the Florida Portland Cement Co.'s plant at Tampa. Messrs. Curtis, Johnson and Drury, the surviving members of the original "Four Horsemen," remain very much on the job, hoping to see Mildred plant complete at least two consecutive years without injury to a man.

FIVE-YEAR ACCIDENT RECORD, MILDRED (KAN.) PLANT, CONSOLIDATED CEMENT CORP.

Department	1924 Lost-time accidents	1924 Days lost	1925 Lost-time accidents	1925 Days lost	1926 Lost-time accidents	1926 Days lost	1927 Lost-time accidents	1927 Days lost	1928 Lost-time accidents	1928 Days lost
Quarry	6	84	1	3	2	31	0	0	0	0
Crushing	3	30	0	0	0	0	0	0	0	0
Raw	2	36	12	178	9	167	0	0	0	0
Burning	4	20	1	1	3	31	0	0	0	0
Finishing	4	95	8	105	9	87	0	0	0	0
Coal grinding	5	55	2	9	0	0	0	0	0	0
Cement storage	1	18	1	8	0	0	0	0	0	0
Packing and shipping	3	117	6	57	0	0	0	0	0	0
Power	2	28	7	81	1	6	0	0	0	0
Shops	4	120	4	9	2	52	0	0	0	0
Railroad	2	25	4	19–1d.	3	101	0	0	0	0
Yard	2	11	10	60	0	0	1	5	0	0
Other than above	3	12–2d.	2	18	0	0	0	0	0	0
Total	41	651	58	548	29	475	1	5	0	0
	2 deaths		1 death		No deaths		No deaths		No deaths	

DATE OF LAST ACCIDENT IN VARIOUS DEPARTMENTS, MILDRED (KAN.) PLANT, CONSOLIDATED CEMENT CORP.

Department	*Date Last Lost Time Accident*
Quarry	Oct. 12, 1926
Crushing	Apr. 25, 1924
Raw	Feb. 22, 1926
Burning	Nov. 19, 1926
Finishing	Oct. 22, 1926
Coal Grinding	Sept. 2, 1925
Cement Storage	Sept. 24, 1925
Packing and Shipping	Dec. 14, 1925
Power	Feb. 11, 1926
Shops	Dec. 13, 1926
Railroad	Feb. 25, 1926
Yard	Mar. 19, 1927
Othen than above	July 17, 1925

of the safety trophy at the Mildred, Kan., plant, Consolidated Cement Corp.

Safety Court at the Fort Worth, Tex. Mill of Trinity Portland Cement Co.

By J. M. Simmons

WE REALIZE that in our mill, as in any other industrial plant, that to prevent accidents, safety work must be ever in the minds of the employes and to accomplish this end there must be some means of creating interest and holding interest. With this purpose in view we have organized a safety court.

A judge was elected to preside over the court, select the jury, appoint the prosecuting attorney and such duties as befalls a judge in regular court. A sheriff was elected who, incidentally, is a man whose regular duty as an employe requires that he go through the entire mill several times a day. It is the duty of the sheriff to be observant on his regular rounds to see if he can detect any employe doing a careless act or doing any thing that will endanger himself or his fellow workers. Should he discover anything of this nature, he is to file charges with the court clerk who issues a notice to that man to appear in the next meeting of the court in answer to charges as turned in by the sheriff. The sheriff also notifies any witnesses that he is able to find. Any employe in the mill can file charges through the sheriff and court clerk.

At five minutes to ten each Monday morning, at our regular safety period, the plant whistle blows indicating that the men in each department selected by the department foreman are to appear in the court room, our regular first-aid room. I might add here that the foremen have no trouble whatever in getting the men to come to the court room for they would all come if possible. It is something that they look forward to.

The meeting is called to order promptly at ten o'clock and the minutes of the previous meeting are read by the secretary. We then have a short discussion on ways and means of preventing hazards asking for suggestions from the men. We get our best recommendations from the men who do the actual work where hazards exist. These recommendations are put in the minutes of the meeting and are read the following week giving account of those carried out.

The meeting is then turned over to "Judge" A. E. Morris (shipping foreman) who opens the court by giving a brief talk on the purpose of the court, stating that it is not intended to create any personal feeling but that it is all in a spirit of fellowship and good will.

The judge then has the first case on the court docket read by the clerk, asks for corrections, appoints a jury, swears in the witnesses, and turns the case over to the prosecuting attorney. The prosecuting attorney and the attorney for the defense, (selected by the defendant) have ten minutes each to question the witnesses of both sides and the defendant himself and five minutes each to sum up and plead the case to the jury. When the defense rests the case the jury retires to the jury room for not more than three minutes after which time they are to return the verdict of guilty or not guilty.

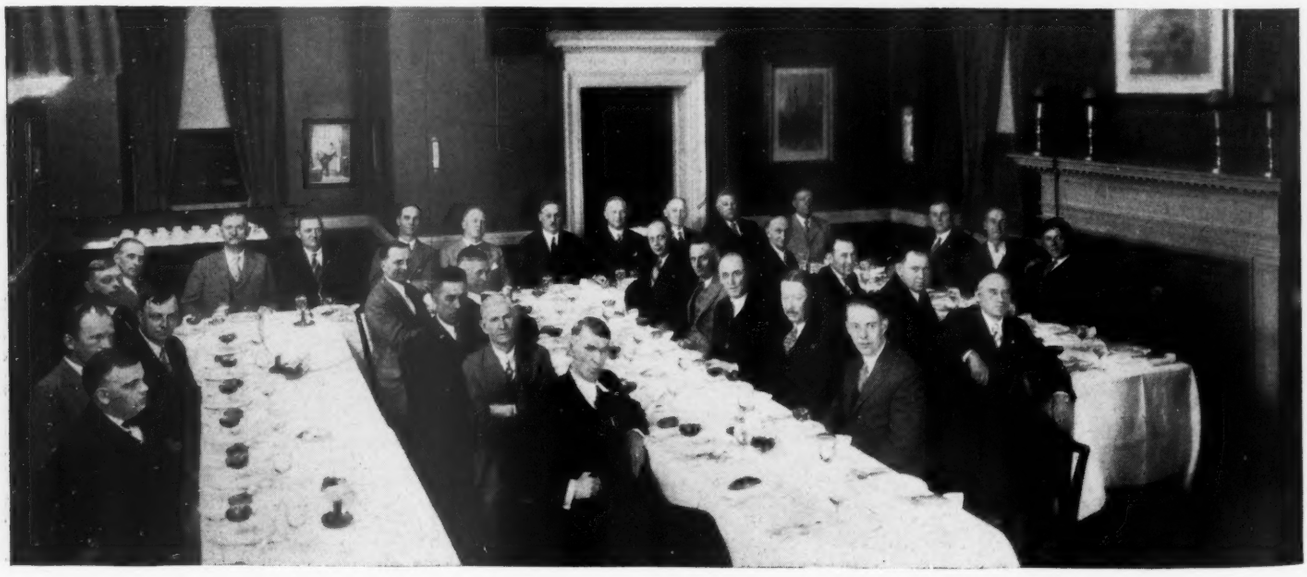
In a case where the defendant is found guilty, the judge gives a talk, or you might say, a lecture to the prisoner which, incidentally, is for the benefit of the entire court on safety work, particularly safety work in line with the case just held.

As an example of our court we will take the case of R. C. Andrews charged with jumping over a third rail on to a moving electric quarry car thereby endangering his life and the safety record of the employes of the Trinity Portland Cement co. Verdict: Guilty. Penalty: The court will have a sign printed large enough to tie on the defendant's back with the following statement in large letters: "I WAS CARELESS." The defendant is to walk up to every man in the plant before the next session of the court, turn around so that the man can see the sign and say, "See that sign, it means that I was careless by jumping over a third rail on to a moving electric quarry car thereby endangering my life and the safety record of the employes of the Trinity Portland Cement Co."

If you don't think that this will make a person careful just get a sign and try it. In each case the penalty is different, the extent of the penalty being governed by the seriousness of the charge. After each meeing I have noticed that the men are anxious to tell those who were not present all about the proceedings of the court.

The fact was demonstrated to me a short time ago as to the impression that this plan has made on the men. I was in the packing department just after a small repair job on a screw conveyor had been completed and the conveyor started up to see if everything was working. The foreman told the repairman to replace the guards and the repairman replied, "No sir, not until I stop this conveyor. They'll file a charge against me sure."

So far as I know, this plan which is the idea of our superintendent, A. A. Chaney, is original in the use of safety work. We have tried record boards, campaigns, and various other methods of creating interest, but we have never had anything go over with the men as this "Safety Court."



Delegates from the winning cement mills at the dinner party held in their honor at New York City

Safe Handling of Explosives*

By E. M. Cowpland
Hercules Powder Co., Joplin, Mo.

PARTICULARLY in open cut, or quarry blasting, one of the primary precautions is to have a competent man directing the loading and firing of explosives. A list of accidents from explosives from almost any industry is composed mainly of accidents that can only be attributed to carelessness or ignorance. With a competent man in charge of blasting, neither carelessness nor ignorance should ever be the cause of an accident from explosives. All of you, I know, have such a man directing your blasting operations, but I wanted to take this opportunity of stressing to each of you the great value of that man from the safety angle.

Opening Boxes and Loading Holes

One of the most common careless procedures is a dangerous method of opening a case of dynamite. I have seen cases opened with a steel shovel and opened by banging them down on a boulder. The very fact that the commercial explosives of today have been developed to a high degree of safety may be partially responsible for this. Still your dynamites will go off or they would be worthless. Hence, they should be handled with much respect. And for opening a case of dynamite a wooden mallet is very much more respectful than a shovel or a rock.

In loading large cartridges in well-drill holes, a cartridge occasionally hangs up part way down instead of reaching the bottom. Often such a cartridge will be as stubborn as to cause great delay and danger. Frequently the short wooden tamping bar attached to a rope is insufficient to break up the cartridge of dynamite so that it will fall to the bottom and open up the hole. Every quarry should keep several 20-ft. to 25-ft. wooden bars or poles of 1-in. to 1½-in. in diameter. If a hung cartridge can be reached with this long bar it can more easily be pushed down a hole. A few operators having irregular, seamy ground and consequent ragged holes, which are frequently plugged with dynamite, go a step further. They know that many men tend to go after a piece of iron pipe to use in opening up an exceedingly bad hole, so they put a union of some sort on the end of several 20-ft. lengths of wood. Then a fairly stiff wooden bar is always available to reach a hung up cartridge at any depth, and the possibility of pipe being used is eliminated.

Safe and Dangerous "Looking Into a Hole"

On this same subject of dynamite stuck in the middle of a well-drill hole, it is invariably desirable to look into the hole if much trouble seems to be encountered. Looking into the hole is about the only way the condition can be accurately determined. Everyone in contact with blasting has reflected sunlight down a well-drill hole. Yet I was surprised recently to hear an old quarry operator talk of lowering a light down a hole on a cloudy day when no sun seemed likely to come to his assistance. To do this with almost any type of lamp is a decidedly unsafe practice when there is an explosive in the hole. A good flashlight can replace the sun and any clear mirror will throw its rays down an 80-ft. hole. To some of you this may seem an instance so rare that it should hardly have been given the time necessary for mentioning it, yet two fatal accidents have occurred in the past 24 months because someone thought it was necessary to lower a light into a well-drill hole containing an explosive.

In any operation using electric blasting caps, do not allow men to continue loading or working on a partially or fully loaded shot, if an electrical storm is near. To many this also seems far fetched, but several times shots have been partially detonated by a thunder storm. This happened not long ago in a small quarry in Oklahoma (Watonga).

Special Precautions Necessary in Secondary Blasting

In most primary blasting operations greater care is taken than in secondary work. After firing, the shot is usually inspected and in case of any missfire that portion which has missed is perhaps readily located.

In secondary blasting, however, shooting boulders, there is often less attention to any fixed procedure, sometimes because such is impossible. But certain methods should be followed always. If more than one shift is working, each shift should shoot all the block holes and dobes that it loads. Otherwise there is great danger of drilling a rock that is already loaded. Casually this may seem unlikely, but I actually saw a man terribly crippled in just that way.

If secondary shooting is done electrically, then each charge should be connected to the preceding one as it is loaded. This will eliminate overloading a charge. And just that has caused several deaths.

Loading secondary shots either with electric caps or plain caps and fuse, it is safest to load only the number of charges that are to be fired at once. Otherwise those not fired immediately may be forgotten and later dug into by a shovel or hit by a drill bit.

Here, as well as in primary loading, it is wise not to rush the loaders. Let them work only so fast as is possible without getting careless. And where caps and fuse are used there should be a limit to the number of fuses one man may light. If this is not done the loader is apt to endeavor to light more than he should. In this case he is likely to be too close when the shots start firing.

Warning Signals and Important Safety Factor

A warning whistle is usually blown before any type of blasting in open-cut mines and quarries. A series of short blasts in rapid succession is the most effective. But with such a signal no one but the loader knows how many shots there are. Suppose there are 15 shots with caps and fuse. One might have a longer fuse or might have been lighted much later than the others. In that case someone may move from cover before all the shots have fired.

One of the largest open-cut operators eliminates this danger in a very good way. A whistle blows the usual warning of short rapid toots, and if there are 15 shots, follows that series of rapid whistles with 15 slower whistles. That is, the whistle counts the shots, and the count is not slow enough to hold up operations at all, yet is quite distinctive from the fast warning whistle. When the last shot has fired the whistle blows two blasts to signal all clear. In that way someone out of sight, but within hearing, knows about what is going on. Having a whistle count the shots before a bunch of secondary blasts is made is a very effective safety device and absolutely does not slow up the game as might be thought.

No Substitute for Intelligent Supervision

You have heard on past occasions so many discussions on the dangers of smoking, having fires or open lamps near explosives, rough handling of caps, etc., that I am not going to take up any of these subjects. Instead, I have tried to mention just a few of the items that are brought up less frequently.

Yet my own idea of truly safe handling of explosives is one of the very oldest and perhaps most repeated. That is, intelligent supervision. And with intelligent supervision every man on any job will invariably apply himself more earnestly and with greater thought. And is the man who really puts a little thought in his work likely to be a careless one?

The explosives with which you come in contact all have a capacity for creating a very strong, disruptive, dangerous force if carelessly handled. When carefully used they are not dangerous. Also, if they are being used with care, the same thought behind that care will lead to a maximum efficiency. And to get that degree of efficiency and safety, in my opinion the keynote is competent, intelligent supervision.

*Talk before Kansas City Safety Meeting, Portland Cement Association.

Foreign Abstracts and Patent Review

Report on Plaster, Its Composition and Characteristics — Alexandre Pellat rendered before the International Technical Congress of Masonry and Reinforced Concrete an account of the occurrences of the raw materials of plasters and of their various physical structures, of the burning process, including physical and chemical data, of setting of plasters and of the control of process in the manufacture of plasters. In calcining, the expulsion of water of combination of the double hydrate $CaSO_4 \cdot 2H_2O$ takes place, three-fourths at 107 deg. C. (224.6 deg. F.), making it a demihydrate, and the remainder at 165 deg. C. (328.4 deg. F.). The theories of Lavoisier, Landrin and Le Chatelier concerning the setting of plasters are given, and control and augmentation of the setting process described. The importance of the analysis of plasters is emphasized, the elementary analysis determining the chemical elements of the plaster and the practical analysis determining the chemical elements of the finished plaster product, as it is being practiced by Swiss manufacturers and some French plants, an example of practical analysis being the following:

COMPOSITION AND CHARACTERISTICS OF GYPSUM PLASTER

		Sample No. 1	Sample No. 2
Active parts	Semihydrate, $CaSO_4 \cdot \frac{1}{2}H_2O$	80.95	78.45
	Soluble anhydrite, $CaSO_4$	0	0
	Hydraulic plaster, $CaSO_4$	6.57	4.30
Inert parts	Unburned gypsum, $CaSO_4 \cdot 2H_2O$	4.73	10.51
	Overburned gypsum, $CaSO_4$, and natural anhydrite	0	0
	Impurities	7.70	6.72

—*Revue des Materiaux de Construction et de Travaux Publics* (1928), 228, pp. 335-337.

Report Concerning Recent Cement Research—Prof. Nacken delivered a report on a recent research in the chemistry of cements at the 51st general meeting of the Society of German Portland Cement Manufacturers at Berlin on March 14, 1928, dealing with the (1) examination of microscope slides of the kinds of crystals in the technical portland cement clinker by A. Guttmann and F. Gille, which showed two crystallized constituents, the alit and the belit, the first said to contain considerable alumina and the second said to be a α or β modification of the di-calcium silicate; (2) further examination of crystals by Professor Nacken with water-free calcium chloride as solvent for the silicates and other combinations, heated to high temperatures, although CaF_2 is also an excellent solvent, with discussion of the tests; (3) study of a number of systems of silicic acid with BaO, SrO, M_2O, FeO and PbO with tables and diagrams concerning various ortho- and meta-silicates giving melting temperatures and formation heat and details of crystals; and (4) discussion of the study of lime action in cement as carried out by Becker and Day at the Carnegie Institute, in which Nacken explains lime action of cement as due to water entering into cement and then into combination with CaO to form $Ca(OH)_2$, in which process a decrease in volume occurs, leaving space for further water to enter repeatedly, which remains being fixed and expands the cement, chipping it off.—*Zement* (1928) **17,** 33, pp. 1231-1237.

Twenty-five Years of Iron-Ore Cement —C. Pruessing states that the portland cement plant at Hemmoor obtained in 1903 a license to manufacture special cement for resisting the salts in sea water, mine waters and others, sulphuric acids; and its product has met with an ever increasing demand from chemical factories and other establishments handling acids and salts, for it is handled just like every first-class portland cement. Though its initial strengths cannot be raised sufficiently to *guarantee* for it the strength of high-grade cements, it reaches this strength, however, in nearly every test. In comparing iron ore cement with high-grade cement, test samples of each mixed in 1:5 proportion with standard sand were prepared, stored in one case in sea water and in another in supply water; after 7 months of storage the tensile strengths were as follows:

	Supply water	Sea water
High-grade portland	17.0 (241.8)	12.7 (180.6)
Ore cement	18.5 (263.1)	20.5 (291.6)
and after 2½ years of storage:		
High-grade portland	16.2 (230.4)	10.9 (155.0)
Ore cement	17.4 (247.5)	22.2 (315.8)

The standard compressive strengths after 28 days combined storage were 599 kg. per sq. cm. (8519.8 lb. per sq. in.) for high-grade portland cement and 511 kg. per sq. cm. (7268.2 lb. per sq. in.) for ore cement. A test with sodium sulphate or Glauber's salt has also shown the superiority of ore cement in aggressive waters. A test with a hot sodium chloride solution showed the tensile strength of ore cement to be nearly double that placed in ordinary hot water. Similar results were obtained by storage in lyes from a potash mine shaft, giving 53.17 kg. per sq. cm. (756.3 lb. per sq. in.) tensile strength as compared to 26.67 kg. per sq. cm. (379.3 lb. per sq. in.) in pure or ordinary water. Additions of trass to ore cement are not harmful if applied correctly, but it is not advisable to use "Antiaqua" with ore cement in the construction of reinforced-concrete ships, for example, for it decreases the compressive strengths considerably, about 54% under 8% addition of "Antiaqua," if stored in water and 39% in combined storage, using a 1:3 mix or ore cement and washed gravel-sand; however, an addition of "packing" mediums of this kind excepting trass has never been found necessary for ore cement in marine construction. Analysis of the good and damaged concrete work on a boiler house operating with the lime-soda purifying process showed the destructive effects of sodium sulphate, so that it appears advisable to use ore cement for structures exposed to such chemicals. Destructive effects upon concrete, observed in coal bins and coal handling equipment, which are caused by the sulphur combinations of damp coal, have urged the use of ore cement and the results have been satisfactory over several years of observation, in which time the iron structures had to be replaced due to corrosion. Analysis of the concrete of chimneys serving various power plants showed that the high content of sulphuric acid anhydride (1.82% to 3.58% corresponding to 12.47% to 35.3% gypsum content) made it impossible for the portland cement to stand up chemically, so that ore cement is the solution, also for concreting railway tunnels, roofs of depots, etc. Ore cement is recommended also for construction work in peat-bearing soil, due to the content of sulphides and sulphates. A bibliography is appended.—*Zement* (1928) **17,** 41, pp. 1496-1500.

Determination of Free Lime in Clinker and Cements—E. Diepschlag and A. Matting, in their review of the researches on this subject, have appended 129 references dating from 1823 to 1926 and in English, French and German, and deal with the presence of free lime and its causes; the methods for determination of free lime, such as methods in aqueous solution, non-aqueous mediums of solution and optical methods; investigations for determining free lime, dealing with testing of $CaCO_3$ and CaO, melting of $2CaO \cdot SiO_2$, tests with $CaO \cdot SiO_2$ and $2CaO \cdot SiO_2$, tests with clinker, testing with water without carbonic acid, miscroscopic testing and with the titration process with ammonia acetate.—*Zement* (1928) **17,** 35, pp. 1306-8; **36,** pp. 1337-1340; 37, pp. 1373-1376.

Recent Process Patents

The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington D. C. Complete copies may be obtained by sending 10c to the Superintendent of Documents, Government Printing Office, Washington, for each patent desired.

Process of Manufacturing Cement—The invention is concerned with cement manufacture by the wet process in rotary kilns by atomizing or similarly dispersing the cement slurry in a finely divided condition in the gases of the kiln. The intention is to provide means of spraying the slurry into the kiln in a direction and at such velocity so as to adhere to the walls of the kiln slightly, as otherwise an excess of cement would be carried out with the exit gases. If the cement slurry is inclined to adhere to the kiln walls, chains or drags can be used to prevent excessive growths. The patentee describes in detail the mechanical construction and operation of his atomizer so as to bring about the above results, and his plans for insuring continuous kiln operation. The methods employed cover a variety of devices including drying the slurry outside the kiln proper (Fig. 3), after these gases have been utilized for making steam in waste-heat boilers. It is claimed that the overall fuel savings from this invention range from 33% to 60%. The device shown in Fig. 4 is especially designed to control the amount of drying to which the atomized slurry is subjected so as to avoid the formation of clinker rings, and also to vary the clinker size and size uniformity to the best possible condition. In the arrangement illustrated in Figs. 5 and 6 measures are adopted to structurally separate the hotter portion of the kiln where the calcining and clinkering is done from the cooler portion where the drying is done. The advantage claimed for this separation is that impurities introduced into the clinker by the combustion of the fuel, such as sulphates, may be settled out in the drying chamber and a better quality of clinker produced.—*Thomas Rigby, U. S. Patent Nos.* 1,699,451, 1,706,747, 1,706,748, 1,706,749 and 1,706,750. [This is a British invention and has been tried out in British portland cement plants.]

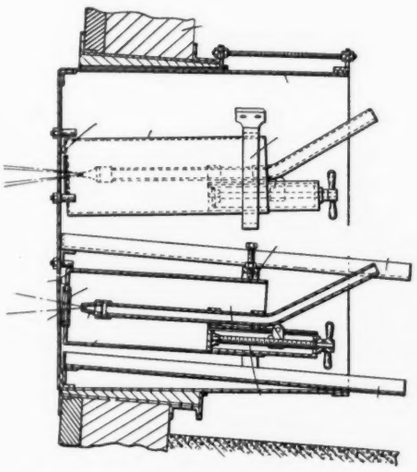


Fig. 1. Atomizing device for spraying cement slurry into kilns

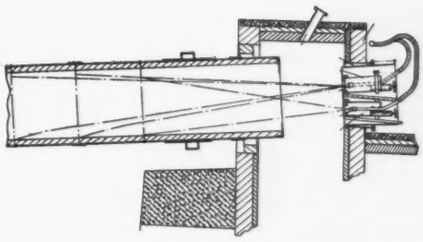


Fig. 2. Atomizing cement slurry into kilns

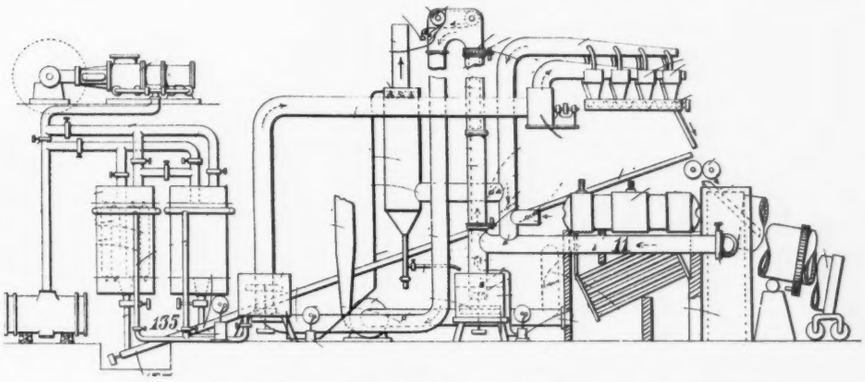


Fig. 3. Drying slurry outside kiln proper with waste-heat gases

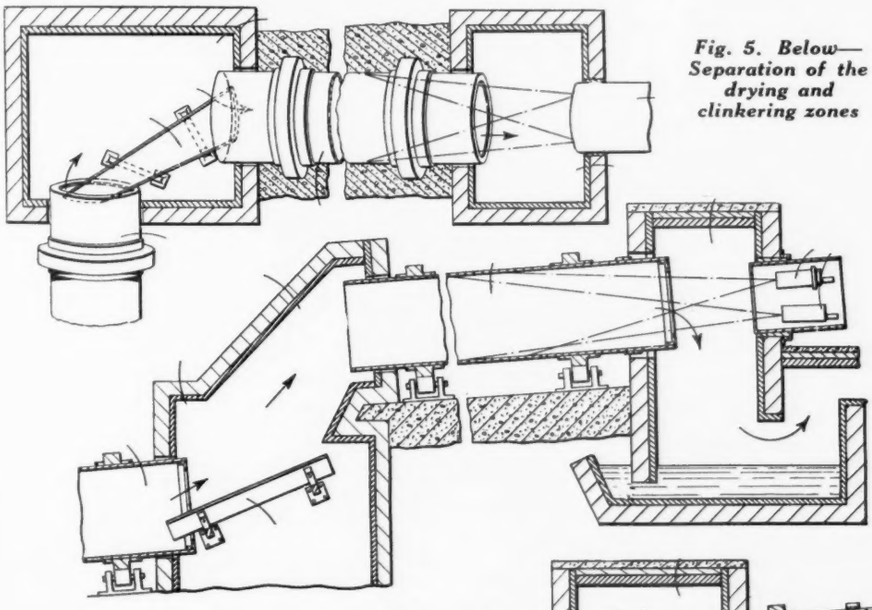


Fig. 5. Below—Separation of the drying and clinkering zones

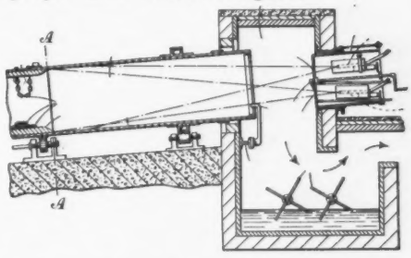


Fig. 4. Design to prevent formation of clinker rings

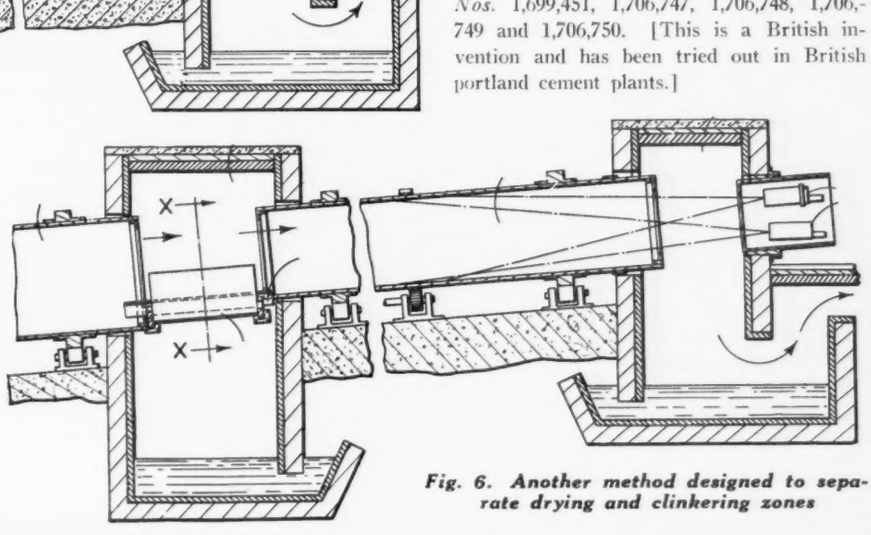


Fig. 6. Another method designed to separate drying and clinkering zones

Traffic and Transportation

Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly car loadings of sand and gravel, crushed stone and limestone flux (by railroad districts) as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

District	Limestone Flux Week ended May 18	Limestone Flux Week ended May 25	Sand, Stone and Gravel Week ended May 18	Sand, Stone and Gravel Week ended May 25
Eastern	3,576	3,878	13,676	15,248
Allegheny	3,852	3,984	8,515	8,569
Pocahontas	452	501	1,191	1,171
Southern	445	560	9,702	9,025
Northwestern	1,323	1,706	6,792	8,760
Central Western	574	601	12,339	13,417
Southwestern	474	536	6,386	6,491
Total	10,696	11,766	58,601	62,681

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1928 AND 1929

District	Limestone Flux 1928 Period to date May 26	Limestone Flux 1929 Period to date May 25	Sand, Stone and Gravel 1928 Period to date May 26	Sand, Stone and Gravel 1929 Period to date May 25
Eastern	49,478	58,087	113,487	112,874
Allegheny	63,328	65,120	95,820	86,034
Pocahontas	6,982	6,492	14,545	12,291
Southern	11,596	9,715	202,014	159,734
Northwestern	19,519	17,839	80,211	65,825
Central Western	8,438	10,838	159,630	153,571
Southwestern	8,500	9,056	107,738	111,929
Total	167,841	177,147	773,445	702,258

COMPARATIVE TOTAL LOADINGS, 1928 AND 1929

	1928	1929
Limestone flux	***167,841***	***177,147***
Sand, stone, gravel	***773,445***	***702,258***

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning June 15.:

SOUTHWESTERN FREIGHT BUREAU DOCKET

17632. **Stone,** from points in Missouri to points in Minnesota. To establish a rate of 22c per 100 lb. on rough quarried stone, carloads (See Note 2), but not less than 40,000 lb., from Phoenix and Carthage, Mo., to St. Paul, Minneapolis, Minnesota Transfer and South St. Paul, Minn. Shippers state that the present rate of 27½c per 100 lb. is manifestly out of line and feel that if the rate of 22c is established that they will be able to move a great deal of stone.

17673. **Sand and gravel,** from Richards Spur, Okla., to points in Texas. To establish a rate of 7c per 100 lb. on **sand, common; gravel and stone, crushed,** in straight or mixed carloads (See Note 1), except when cars are loaded to actual visible capacity, actual weight shall govern, but in no case less than 50,000 lb., from Richard Spur, Okla., to Goodlett and Herg, Tex. The basis proposed is already in effect to stations in the vicinity of Herg in Item 3106 of S. W. L. Tariff 26-Y. This basis is now in effect to Goodlett via R. I., Waurika, W. Va., F. W. & D. C. Proponent is merely meeting competition.

WESTERN TRUNK LINE DOCKET

2898-F. **Sand and gravel,** carloads (See Note 1), from Forreston, Ill., to I. C. R. R. stations in Iowa. (Rates in cents per ton of 2000 lb.):

(Representative)	Present	Proposed
Julien	130	106
Manchester	150	122
Waterloo	160	141½
Cedar Rapids	160	141½
Waverly	170	150½
Charles City	180	161½
Parkersburg	**170**	**153**
Iowa Falls	180	161½

(Proposed rates are the Iowa distance rates.)

6925. **Sand and gravel,** carloads, as described in Items 9190 and 9200, W. T. L. Tariff 111-G, from stations shown in above items located in Missouri, Illinois, Wisconsin and Michigan to Colorado common points as described in above items. Present, 34½c (See Note 2). Proposed, 30c; minimum weight 100,000 lb.

1376-E-E. Rates and minimum weights. **Sand, silica,** carloads, from Hebron, Neb., to Omaha, Neb., Kansas City, Mo., Mississippi River, Peoria, Chicago, Ill., St. Paul, Minn., etc. Present, class rates; proposed, same rates and minimum weights to be established as now in effect from Calvert, Kan., to Omaha, Kansas City, Mississippi River, Peoria, Chicago, St. Paul.

6907. **Stone, crushed,** carloads, usual minimum weight, from Croton, Ia., to Ottawa, Ill. Present rate, 17c per 100 lb. (Class E); proposed, $1.55 per net ton.

ILLINOIS FREIGHT ASSOCIATION DOCKET

5045. **Common sand or gravel,** carloads (See Note 3), but not less than 4000 lb., from Sheridan, Ill., to Utica, Marseilles and Seneca, Ill. Present, no joint through commodity rate; proposed, 88c per net ton.

Note 1—Minimum weight marked capacity of car.
Note 2—Minimum weight 90% of marked capacity of car.
Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

5039. **Crushed stone,** carloads, from Thornton, McCook and Chicago, Ill. Present—To Madison, Wis., $2.40 per net ton; $1.20 per net ton. To Beloit, Wis., $2.10 per net ton; $1.20 per net ton.

5051. **Sand and gravel,** carloads, from Forreston, Ill., to Freeport, Ill. Present rate, 60c per ton (See Note 1); proposed, 50c per ton (See Note 1).

5057. **Limestone, crushed or ground,** carloads, from Eldred and Alton, Ill., to C. F. A. destinations as listed in Item 748, Boyd's Tariff 58M. Present rates, class or combination; proposed, 65% of sixth class rates (See Note 3).

5047. **Crushed stone** (in bulk) and articles taking same rates, viz., rough, rip rap, rubble, etc, carloads (See Note 3), from Kankakee, Lehigh, Van's Siding, West Kankakee, Ill., to Pence, Finney, Judyville and Freeland Park, Ill. Present rate, 88c; proposed, 76c.

5066. **Sand and gravel,** carloads, usual minimum weight, from Beloit and Janesville, Wis., to Chase, Ill. Present—7½c per 100 lb. Proposed—90c per net ton.

5073. **Crushed stone, sand and gravel,** carloads, from Joliet, Millsdale and Lincoln, Ill., to stations on the Wabash R. R. in Illinois, viz.: Saunemin, Emington, Campus, Wing, Cardiff and Reddick, Ill. Present—Class or combination. Proposed—$1.01 per ton.

CENTRAL FREIGHT ASSOCIATION DOCKET

21701. To establish on **sand and gravel,** carloads, Gosport, Ind., to Solsberry, Ind., via C. I. & L. Ry., Bloomington, and I. C. R. R., rate of 90c per net ton. Present rate— Sixth class.

21702. To establish on **sand and gravel,** carloads, Fort Jefferson, O., to Crete, Ind., rate of 60c per net ton. Present rate—70c per net ton.

21704. To revise all commodity rates which are on less than basis of 50c per net ton on **sand,** carloads, from the Dune Park District to East Chicago, Hammond, Ind., and points in the Chicago District to 50c per net ton.

21708. To establish on **sand and gravel,** carloads, Cleves, O., to Hayden, Ind. Rate of 95c per net ton, to apply via C. C. C. & St. L. Ry., Lawrenceburg, Ind., and B. & O. R. R. Present rate—(1) 117c per net ton. (1) Present rate to Seymour, Ind., under intermediate rule.

21712. To establish on **ground or pulverized limestone,** carloads, minimum weight 60.000 lb., from points within the Chicago, Kankakee and Joliet districts to C. F. A. territory, rates on basis of 60% of sixth class.

21744. To establish on **sand, common, building, glass or molding, and gravel,** carloads, Mentor, Augusta and Ausanba, Ky., to Richmond, Ind. Rate of 190c per net ton. Present rate—214c per net ton.

21747. To establish on **crushed stone,** carloads, Melvin, O., to destinations in Ohio shown below. Present and proposed rates in cents per net ton.

To—	Pro. rate	Pres. rate	To—	Pro. rate	Pres. rate
Athens	80	100	Wellston	80	90
Jackson	80	90	Coalton	80	90
Hamden	80	90	Glen Roy	80	90
Dundas	80	100			

21752. To establish on **crushed stone,** carloads, Mitchell, Ind., to Oakland City and Plainville, Ind. Rates of 100c and 90c per net ton, respectively. Present rates—122c to Oakland City, Ind., and 109c per net ton to Plainville, Ind.

21753. To establish on **crushed stone,** in bulk, carloads, and **agricultural limestone,** in bulk, in open top cars, carloads, from Raney Spur, Ind., to various destinations, rates as shown in Exhibit A attached.

EXHIBIT A

To (E. I. & T. H. Ry.)	Prop. Rate	Present Rate A	Present Rate B
Elnora, Ind.	$0.85	$0.13	$0.85
Plainville, Ind.	.80	.13	.80
Albright, Ind.	.80	.13	.80
Hyatt, Ind.	.80	.13	.80
Graham, Ind.	.80	.13	.80
Jordan, Ind.	.75	.13	.75
King, Ind.	.75	....	.75
Marysville, Ind.	.75	.13	.75
Mandaback, Ind.	.75	.13	.75
Thomas, Ind.	.80	.13	.80
Greenmound, Ind.	.80	.13	.80
Commerce, Ind.	.80	.13	.80
Sandy Hook, Ind.	.80	.13	.80
Rogers, Ind.	.80	.13	.80
Gladstone, Ind.	.80	.13	.80
Bennett, Ind.	.80	.13	.80
Blackburn, Ind.	.80	.13	.80
Petersburg, Ind.	.80	.13	.80
Ashby, Ind.	.85	.13	.85
Glezen, Ind.	.85	.13	.85
Hosmer Siding, Ind.	.85	.13	.85
Little, Ind.	.85	.13	.85
Massey, Ind.	.90	.13	.90
Oakland City, Ind.	.90	.13	.90
(C. C. C. & St. L. Ry.)			
Marshall, Ill.	1.10	.16	* .16
Arnolds Switch, Ill.	1.10	.16	* .16
Snyders, Ill.	1.10	.16	* .16
Walnut Prairie, Ill.	1.10	.16	* .16
West Union, Ill.	1.05	.16	* .16
Rock Hill Switch, Ill.	1.05	.16	* .16
West York, Ill.	1.05	.16	* .16
Coal Dock Switch, Ill.	1.05	.16	* .16
Hutsonville, Ill.	1.05	.16	* .16
Trimble, Ill.	1.00	.16	* .16
Robinson, Ill.	1.00	.14½	* .14½
Duncanville, Ill.	.95	.14½	* .14½
Flat Rock, Ill.	.95	.14½	* .14½
Birds, Ill.	.95	.14½	* .14½
Pinkstaff, Ill.	.90	.14½	* .14
Billet, Ill.	.90	.14	* .14
St. Francesville, Ill.	.95	.14	* .14
Allendale, Ill.	.95	.14	* .14
Patton, Ill.	1.00	.14	* .14
Mt. Carmel, Ill.	1.00	.14	* .14
Schrodts, Ill.	1.05	.15	* .15
Keensburg, Ill.	1.05	.15	* .15
Cowling, Ill.	1.10	.15	* .15
Grayville, Ind.	1.10	.15	* .15
Calvin, Ill.	1.10	.16	* .16
Crossville, Ill.	1.10	.16	* .16
Simpson, Ill.	1.10	.16	* .16
(C. & E. I. Ry.)			
Duncan, Ind.	.85	.13½	.85
Purcell, Ind.	.90	.13½	.90
Vollmer, Ind.	.90	.13½	.90
Decker, Ind.	.90	.13½	.90
Hazelton, Ind.	.90	.13½	.90
Miller, Ind.	.95	.14	.95
Patoka, Ind.	.95	.14	.95
Princeton, Ind.	1.00	.14	1.00

A—Crushed stone (sixth class).
B—Agricultural limestone, in bulk, mileage scale per P. S. C. of I. Docket 7626, except as noted.
*Sixth class.

21754. To establish on **crushed stone and crushed stone screenings,** in bulk, in open top cars, carloads, Kenneth, Ind., to Richmond, Olive Hill and Green Forks, Ind., rate of 105c per ton of 2000 lb. Present rate—127c per ton of 2000 lb.

21763. To establish on **crushed stone and crushed stone screenings,** carloads, Narlo, O., to West Park, O., via N. Y. C. & St. L. Ry., Bellevue, O., N. Y. C. R. R., rate of 80c per net ton. Present rate, 90c per net ton.

21764. To establish on **crushed stone,** in bulk, in open cars, carloads, Dunkirk, O., to Harpster and Morral, O., rate of 70c per net ton. Present rate, classification basis of 230c per net ton.

21765. To establish on **sand, core,** carloads, Smith's Pit, Mich., to Vassar, Mich., rate of 63c per net ton. Present rate, 180c per net ton.

20982. (A) **Building sand,** carloads; (B) **blast, engine, glass and molding sand and ground flint,** carloads (See Note 2), from Berkeley Springs, Hancock and Great Cacapon, W. Va., to Pennsylvania destinations shown below:

To	Proposed Rates A	B
Stockertown	$2.75	$3.00
Wind Gap	2.75	3.00
Pen Argyl	2.75	3.00
Bangor	2.75	3.00

From Triplett, Va., to	Proposed (1) B
Stockerton	$3.00
Wind Gap	3.00
Pen Argyl	3.00
Bangor	3.00

(1) Glass sand only.
The above rates in cents per 2000 lb.
Reason—Proposed rates compare favorably with rates from Berkeley Springs district to Bethlehem, Rittersville and Allentown, Penn.

M1150. **Gravel and sand,** N. O. I. B. N. in O. C., except blast, engine, foundry, glass, molding, quartz, silex and silica, carloads (See Note 2), from Sherburne, N. Y., to Bridgewater and East Winfield, N. Y., 60c per net ton (present rate 83c per net ton). Proposed rate to expire December 31, 1929. Reason—To meet motor truck competition.

M1152. **Crushed stone, trap rock, mine rock, broken stone, crushed stone and stone screenings,** carloads (See Note 2), from Sherburne, N. Y., to Bridgewater and East Winfield, N. Y., 60c per net ton (present rate 83c per net ton). Proposed rate to expire December 31, 1929. Reason—To meet motor truck competition.

21770. To establish on **crushed stone, agricultural limestone or agricultural limestone screenings,** carloads, Broadway, O., to various Ohio destinations, rates as shown in Exhibit A attached. Present rates—Sixth class.

EXHIBIT "A"
(Proposed Rates in Cents Per Ton of 2000 Lb.
From Broadway, O.)

To		To	
Dayton	90	Caledonia	75
Kneisleys	90	Martel	80
Wright	90	Galion	80
Osborn	85	Ontario	85
Enon	80	Mansfield	90
Durbin	80	Summit	90
Sugar Grove Hill	80	Pavonia	95
Springfield	80	Dyke Siding	95
Maitland	80	Milton	95
Bowlusville	75	Ashland	100
Urbana	70	Nankin	100
King's Creek	65	Polk	100
Kennard	60	West Salem	100
Mingo	60	Burbank	105
North Lewisburg	60	Creston	105
Pottersburg	60	Sterling	105
Peoria	60	Rittman	115
Claiborne	60	Wadsworth	115
Richwood	60	Silver Creek	115
Woodland	60	Sherman	115
Codding	60	Barberton	115
Green Camp	60	South Akron	115
Marion	65	Akron	125
Slicks	70		

21805. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and **gravel,** carloads, Massillon, O., to Amherst, O. (N. Y. C. delivery), rate of 90c per net ton. Present rate—100c per net ton.

21878. To establish on **stone, viz.: Broken, crushed, rip rap, rough rubble and crushed granite,** carloads, Manistique, Mich., to Port Huron, Mich. Rate of $2.01 per net ton, applicable on traffic originating in the upper peninsula of Michigan. Present—Sixth class.

21869. To cancel rate of $5 per car, applying on **limestone screenings,** carloads, Fairport Harbor, O. (ex-lake), to Fairport Harbor, O., point of connection with the Fairport, Painesville and Eastern Railroad Co., published in B. & O. R. R. Freight Tariff Ohio No. 5318, I. C. C. 20468. Class rates will apply in lieu of cancelled commodity rate.

21889. To establish on **sand, core,** carloads, St. Charles, Mich., to Flint, Mich., rate of 88c per net ton. Present rate—Sixth class rate of 270c per net ton.

21891. To establish on **crushed stone,** carloads, Greencastle, Ind., to La Porte, Ind., rate of 125c per net ton. Present rate—Sixth class.

TRUNK LINE ASSOCIATION DOCKET

20992. **Crushed stone,** carloads (See Note 2), from Northampton, Penn., to Stroudsburg and Portland, Penn., $1.10 per net ton. Reason—Proposed rate is comparable with rate from Bethlehem, Penn., to Stroudsburg, Penn.

20994. **Trap rock, mine rock, broken stone, crushed stone and stone screenings,** in bulk, carloads (See Note 2), from Millington, N. J., to Chester, N. J., 81c per net ton. Reason—Proposed rate compares favorably with rate from Millington, N. J., to Greendell, Johnsonburg and Blairstown, N. J.

21010. **Crushed stone,** carloads (See Note 2), from Croxton, N. J., to points in New Jersey and New York on the N. Y. S. & W. R. R., Northern R. R. and N. J. & N. Y. R. R., Homestead, New Durham, Hackensack, N. J., Tappan, Pearl River, New City, N. Y., and various, rates ranging from 60c to 80c per net ton. Reason—Proposed rates are comparable with rates on like commodities from and to points in the same general territory.

21021. To revise the rates on **crushed stone,** carloads (See Note 2), from points in the Frederick-Martinsburg-Strasburg districts to B. & O. R. R. stations, Ravenswood, Duncan, Spencer, Cottageville, Ripley, Slate, Newark, Owensport, W. Va., and various, rates ranging from $2.30 to $2.60 per net ton. Reason—The proposed rates are comparable with rates now in force on sand and gravel from and to the same points.

21022. To revise the rates on **building sand,** carloads, in open top equipment (See Note 2), from Berkeley Springs district, W. Va., to points on the B. & O. R. R. west of Cumberland, Md., rates ranging from 90c to $1.50 per net ton. Reason—The proposed rates are fairly comparable with rates now in force from Cumberland, Md., to same points of destination.

20894. **Limestone, unburnt, ground or pulverized,** carloads, minimum weight 50,000 lb., from Bellefonte, Pleasant Gap and Ashcom, Penn., to stations Mine No. 28 and Mine No. 38, W. Va., 12c per 100 lb.

21037. **Ground limestone,** carloads, minimum weight 50,000 lb., from Bellefonte, Pleasant Gap and Ashcom, Penn., to Johnstown, Penn., 9c per 100 lb. (present rate 10c per 100 lb.) Reason—Proposed rate is comparable with rates on like commodities from and to points in the same general territory.

21045. **Sand,** carloads (See Note 2), from Pinewald, N. J., to Chatsworth and Pine Crest, N. J., 90c per net ton (present rate $1.27 per net ton). Reason—Proposed rates compare favorably with rates to Asbury Park and Spring Lake, N. J.

21048. **Crushed stone,** carloads (See Note 2), from New Hope, Penn., to Philadelphia stations on Reading Co., viz.: Willow St. Wharf to Belmont, Penn.; Port Richmond to Laurel Hill, Penn.; 10th and Berks Sts. to 22nd St. (Philadelphia), Penn.; Wayne Jct. to Germantown, Penn.; Noble St. to Erie Ave., Penn.; Crescentville to Frankford, Penn.; Greenmount to Cheltenham, Penn., proposed, 80c; present, 90c. Rates in cents per 2000 lb. Reason—The proposed rate is on the basis of the Birdsboro Stone Scale.

21049. **Ground limestone,** carloads, minimum weight 50,000 lb.

TO SOUTH SALISBURY, MD.

From	Prop. Rate	From	Prop. Rate
Philadelphia Stas., Penn.	11½	Spring Grove, Penn., to Hanover, Penn.	12½
Union Stone Co., Penn.	12	Union Bridge, Md., to Frederick, Md.	12½
Bainbridge, Penn.	12	Campbell, Penn., to Wrightsville Penn.	11½
Rheems, Penn.	12	Codorus Mills, Penn.	11½
Ashcom, Penn.		Myers Mills, Penn.	11½
Bellefonte, Penn.		Emigsville, Penn.	11½
Shraders, Penn.		Lemoyne, Penn.	12½
Pleasant Gap, Penn.		Falling Waters, W. Va.	
Kentmere, Del., to Wilmington, Del.	11½	Berkeley, W. Va.	
Baltimore Stas., Md.	12	Bunker Hill, W. Va.	
Avondale, Penn.	11		
Texas, Md.	12		
Cockeysville, Md.	12		
York to York Fair Grounds, Penn.	12		

The above rates in cents per 100 lb. Reason—Proposed rates are comparable with rates now in force to Salisbury, Md.

21051. To increase rate of 24c to 26c per 100 lb. applying on **sand,** carloads (See Note 2), from Lumberton, Brown, Reeves, Wilkins and Medford, N. J., to Montreal, Que. Reason—To place the rates on a proper basis.

M-1160. **Crushed stone,** carloads (See Note 2), to Rita, Penn., from Northampton, 90c, and from Bethlehem, Penn., $1 per net ton. Reason—The proposed rates are based on the Lycoming sand and stone scale.

21053. **Sand,** other than blast, engine, foundry, molding, glass, silica, quartz or silex, carloads, **and gravel,** carloads (See Note 2), from Baltimore, Md., to Van Bibber, Md., 85c per net ton (present rate $1.05 per net ton). Reason—The proposed rates are comparable with rates on like commodities for like distances, services and conditions.

21054. **Sand,** other than blast, engine, foundry, molding, glass, silica, quartz or silex, carloads, also **gravel,** carloads (See Note 2).

TO QUEEN ANNE, MD.

From	Prop.	Pres.
Bacon Hill, Md.	115	125
North East, Md.	115	125
Charlestown, Md.	115	125
Principio, Md.	115	125

TO WILLOUGHBY, MD.

From	Prop.	Pres.
Bacon Hill, Md.	115	160
North East, Md.	115	160
Charlestown, Md.	125	160
Principio, Md.	125	160

The above rates in cents per net ton. Reason—Proposed rates are fairly comparable with rates on like commodities to Harrisburg, Penn., Cannon and Ellendale, Del., also from Lewes, Del., to Farnhurst, Del., and Queen Anne, Md.

21060. (A) **Sand,** other than blast, engine, foundry, molding, glass, silica, quartz or silex, carloads; (B) **crushed stone,** carloads (See Note 2). From Morrisville, Penn., to Medford, N. J.: Proposed, (A), 80c; present, (A), 125c; from Morrisville, Penn., to Atsion, N. J.; Proposed (A), (B), 140c; present, (A), (B), sixth class. The above rates in cents per net ton. Reason—Proposed rates are comparable with rates on like commodities from and to points in the same general territory.

21074. **Crushed stone,** carloads (See Note 2), to points in Pennsylvania.

CASPARIS, PENN.

To— (Monongahela Ry.)	Prop. Cents	To— (Monongahela Ry.)	Prop. Cents
Arensburg	70	Century Coke Co.'s Siding	70
Isabella	70	Simpson	70
Lamber	70	Allison	70
Ifield	70	Merrittstown	70
Martin	70	Republic	70
New Geneva	70	Ralph	70
Friendship Hill	70	Brier Hill	70
Poland	70	Low Phos	70
Dilliner	70		

Present rate, 80c.

CONNELLSVILLE, BLUESTONE CO., PENN.

To— (Monongahela Ry.)	Prop. Cents	To— (Monongahela Ry.)	Prop. Cents
Arensburg	70	Simpson	70
Isabella	70	Allison	70
Martin	70	Merrittstown	70
New Geneva	70	Republic	70
Friendship Hill	70	Ralph	70
Poland	70	Brier Hill	70
Dilliner	70	Low Phos	70
W. Point Marion	70		
Century Coke Co.'s Siding	70		

Present rate, 80c.

DUNBAR, PENN.

To— (Monongahela Ry.)	Prop. Cents	To— (Monongahela Ry.)	Prop. Cents
Maxwell	70	Dilliner	70
La Belle	70	W. Point Marion	70
E. Fredericktown	70	Century Coke Co.'s Siding	70
E. Millsboro	70		
Poland	70		

Present rate, 80c.
Rates in cents per net ton.
Reason—Proposed rates are fairly comparable with rates on like commodities for like distances, services and conditions.

21075. (A) **Sand** (other than blast, engine, filter, foundry, glass, moulding, quartz, silex or silica), carloads, and (B) **sand, blast, engine, filter, foundry, glass, molding, quartz, silex or silica,** carloads (See Note 2), to stations on the C. R. R. of N. J., N. Y. & L. B. R. R. and P. R. R., Brooklyn, N. Y., Jersey City, Elizabethport, Red Band, Rahway, Trenton, Roebling, Burlington, N. J., and various, from southern Jersey sand shipping points in the Passadena, Woodbury, Pomona, Tuckahoe, N. J., districts, (A) rates ranging from $1.25 to $2 per net ton; (B) rates ranging from $1.25 to $2.45, and from points in the Mauricetown, Bivalve, Absecon, Cape May, Atlantic City and Stone Harbor, N. J., district, (A) rates ranging from $1.37 to $2.30 per net ton, and (B) rates ranging from $1.37 to $2.55 per net ton. Reason—Proposed rates are fairly comparable with rates from the Pinewald-Toms River district.

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

17093. **Sand, molding** (See Note 3), from Rocky Hill, Conn., to Dundee, N. J. Present, **22½c**; proposed, $3.70 per net ton. Reason—To provide a rate that will permit movement of traffic.

New Freight Rates Fixed for Sand, Gravel and Crushed Stone in Southwest

Interstate Commerce Commission Decision in Investigation Under Hoch-Smith Resolution Prescribes Scale Based on Mileage; Discrimination Is Found

A MILEAGE SCALE basis of maximum reasonable rates on sand, gravel, crushed stone, shell and related commodities for application in the Southwest was prescribed by the Interstate Commerce Commission in a report and order made public on June 17 following an investigation of the rates in Part II of its rate structure investigation, No. 17,000, under the Hoch-Smith resolution.

Undue prejudice was found to exist against persons in interstate commerce and unjust discrimination by reason of intrastate rates between points in Louisiana and rates 8 cents a ton higher than the basic scale were prescribed from points in Arkansas to destinations in Louisiana west of the Mississippi river as well as for application intrastate between points in western Louisiana and northern Louisiana.

Commissioner Eastman, in a dissenting opinion, objected on the ground that the rates prescribed are on the whole lower for the shorter distances than those prescribed for southern territory and also than those prescribed for central territory in previous cases.

Proposed Scale

The proposed maximum scale begins at 50 cents a ton for distances 10 miles and under and runs up to $3.50 a ton for 770 to 800 miles.

A brief abstract of the report, by Chairman Lewis of the commission, including the full text of the findings and of the separate opinions, follows:

Exceptions to the report proposed by the examiner were filed by the carriers and various shipping and receiving interests, and oral argument was had. Our conclusions differ somewhat from those which the examiner recommended.

Upon petition of the Arkansas State Highway Commission, on September 28, 1926, we reopened for further hearing Memphis-Southwestern Investigation, 77 I. C. C. 473, and cases embraced therein, hereinafter referred to as No. 9702, in so far as that proceeding relates to carload rates on sand and gravel. Further hearing was had and a proposed report was issued.

Subsequently, however, the Louisiana Public Service Commission and the Louisiana Highway Commission filed a petition for further hearing in 9702, and also in No. 8845, *Natchez Chamber of Commerce v. L. & A. Ry. Co., 58 I. C. C. 610, hereinafter referred to as the Natchez case, in so far as that proceeding involved the carload rates on sand, gravel, crushed stone and shells in the Southwest. Complaints were also pending in Nos. 16002 and 18702, which attacked the rates on sand, gravel and chat from points in Arkansas to points in Louisiana as being unreasonable and unduly prejudicial, and which had been only partially heard.

As a result of the situation disclosed we concluded to assign for hearing, in connection with further hearings in Nos. 9702, 16002 and 18702, No. 17000, Rate Structure Investigation, which investigation was instituted on March 12, 1925, pursuant to joint resolution of the Congress approved January 30, 1925, and usually referred to as the Hoch-Smith resolution, in so far as the said investigation relates to the interstate rates and to the intrastate rates under section 13 of the interstate commerce act, on sand, gravel, crushed stone, shells and related commodities taking the same rates, in carloads, between points in Arkansas, Oklahoma, Texas and Louisiana west of the Mississippi river, herein referred to as western Louisiana, but including both banks of the Mississippi river bordering on that part of Louisiana and Arkansas. This portion of No. 17000 is designated as Part II, Sand and Gravel.

Inasmuch as the Louisiana Public Service Commission had instituted an investigation into the intrastate rates on these commodities within western Louisiana, and we had indicated a desire that the interested state commissions participate cooperatively with us in these proceedings, the Louisiana Public Service Commission withdrew from the petition above mentioned, which had been filed by it jointly with the Louisiana Highway Commission, and the proceedings before this commission, together with those involving the intrastate rates on the same commodities within the states of Texas, Oklahoma, Arkansas and between points in western Louisiana, which were pending before the respective commissions of those states, were heard jointly under the cooperative plan.

Points in Missouri Affected by Action

In addition to the territory herein considered under the No. 17000 investigation, there are also brought in issue rates to and from certain points in Missouri by reason of the reopening of No. 9702. In that proceeding we prescribed interstate rates, among others, on sand and gravel from Memphis, Tenn., to points in Missouri on and south of the line of the St. Louis-San Francisco railway running from Cape Girardeau, Mo., through Mingo, Mo., to Springfield, Mo., inclusive; also from St. Louis and Kansas City, Mo., to points in Arkansas located on certain lines and to Shreveport and Alexandria, La.

As the result of a joint conference, had after the proceedings were called for hearing, between representatives of the carriers, the state highway commissions and producers, agreements were reached as follows:

1. That the commodities that should be covered by rates that may be prescribed herein should be as follows:

Sand, except asbestos sand; gravel, crushed stone (broken stone ranging in size up to 200 lb. weight), including ground limestone, in bulk or in bags, but not including gypsum rock; riprap (irregular shaped rock) in pieces ranging up to 200 lb. weight; clay (except ground clay in bags and treated or milled fire clay; common shells, whole or crushed; crushed tile and crushed sewer pipe (imperfect hollow tile and sewer pipe crushed for use instead of crushed stone); soil; cinders; crushed bricks or brickbats; chat (mine gravel), whole or crushed, and slag, not pulverized, in bulk, in straight or mixed carloads.

What is known as silica sand is not included in the above description. It is the subject of testimony and is treated separately herein.

2. That a difference in transportation rates is not warranted on the respective commodities covered by the above agreed-to description.

3. That the same basis or level of rates shall apply for general application on the commodities contained in the above commodity description throughout the territory covered by these proceedings, it being the carriers' position, however, that the scale prescribed should be constructed with due regard to the varying operation and transportation conditions existing in such territory.

Subsequently, representatives of the Arkansas interests and of the Louisiana Highway Commission explained that their agreement to item 3 was predicated upon the adoption herein of the scale proposed by the highway commissions and shippers. It is the contention of the Arkansas interests that the traffic and transportation conditions within that state are more favorable than in the southwest as a whole. With these qualifying statements attached the agreement loses much of its force.

4. That a single-line and joint-line distance scale of rates should be adopted, it being understood that the shippers desire such rates to be stated in cents per ton of 2000 lb. and the carriers in cents per 100 lb.

Highway Officials Take Active Part

The record embraces much testimony and voluminous exhibits. It concerns chiefly rates, both interstate and intrastate, on sand, gravel, crushed or broken stone, shells and chat. These commodities are used chiefly in the building of highways and in concrete construction work. Some of them are also used extensively for railroad ballast. As the freight rates on these commodities represent a substantial part of the cost of improved highways, the highway commission of each of the states of Louisiana, Arkansas, Oklahoma and Texas were represented and took an active part in the proceedings. Road-building material used in the construction of roads in Arkansas and Louisiana is purchased directly by the respective highway commissions of those states after calling for bids. They also pay the freight charges from the plant to point where the material is to be used.

The record contains considerable evidence, not necessary to here recite in detail, respecting the present status of, and prospective plans for road-building in these states, the cost per mile of building the various types of roads, the cost of maintenance and the different elements that enter into their cost. Each state is naturally interested in increasing its mileage of improved highways as rapidly as possible.

Constitute Large Volume of Freight Movement

These commodities move in great volume in the Southwest and produce a substantial part of the carriers' revenue. They constituted 11.08% of the total tonnage handled by Class I railroads in the southwestern region in 1925. Data of record show, for example, that 2,992,639 tons of sand, gravel, crushed stone and shells were produced during 1926 in western Louisiana, and that during the two-year period October 1, 1925, to October 1, 1927, there were shipped to the Louisiana Highway Commission 1,236,222 tons of this road-building material for use in western Louisiana, the freight charges on which amounted to $806,128.

There are at least 300 points, and probably many more, scattered throughout the territory embraced within these proceedings where one or more of the considered commodies are produced. Gravel is perhaps produced in greater abundance than any one of the other commodities. There is practically no production of gravel in western Louisiana, however, south of an east-and-west line passing through the state about 20 miles south of Alexandria. The only point in Louisiana producing crushed stone is Winfield, located in this north-central part of the state. There is very little road-building material produced in the delta section of Arkansas. Oyster shells are secured along the coast of Louisiana and Texas.

Each of the southwestern states produces sufficient amounts of these commodities for its own use and it is, perhaps, not far from correct to state that at least 90% of the movement is intrastate. There is, however, an interstate movement from points in adjoining states near the border and it is the desire of each producing point to have rates which will permit it to ship and compete in territory that can not be profitably reached under the present various rate adjustments.

The averages of the joint-line and single-line hauls of this traffic in the respective states are, in Louisiana, from 75 to 80 miles; in Arkansas, from 50 to 60 miles; in Texas, from 90 to 100 miles; and in Oklahoma from 85 to 90 miles. Approximately 35% of the total movement throughout the territory considered is joint line.

Movements of certain of these commodities do occur at times in this territory that reach as high as 600 or 700 miles. Especially is this true in connection with the transportation of chat. It is generally agreed that whatever scale or scales is or are herein prescribed should extend for 800 miles in order to comprehend all movements that may occur.

There is a considerable range in the prices of these commodities throughout the considered territory. Competitive conditions have much to do with the prevailing prices at the different points of production. Taking the territory as a whole, it would appear that the prices per ton at shipping point range about as follows: Washed gravel, from 60c to $1.15; clay gravel, from 40c to 60c; sand, from 45c to 70c; crushed stone, from $1 to $1.50; shells, from $1.20 to $1.40; and chat, from 25c to 35c.

These commodities, as we have frequently stated, are among the lowest grades transported and will not move except at comparatively low rates. They are generally transported in open-top cars, load to the car capacity, and move with little risk of damage or loss. Their average loading in the Southwest is about 50 tons per car.

(The prescribed scale of rates will be published in the following issue.—Editor's Note.)

Lime Group Basis Proposed

EXAMINER A. J. Sullivan, in No. 21177, Chemical Lime Co. et al. vs. Pennsylvania et al., has recommended that Chemical and Lime Centre, Pa., stations on the Bellefonte Central, a few miles from Bellefonte, Pa., the junction point between a branch of the Pennsylvania and the Bellefonte Central, be placed on the Bellefonte group basis as to rates on lime and ground limestone to destinations in official territory. The recommendation is based upon a proposed finding that the rates on the commodities in question are unreasonable and unduly prejudiced to the extent they exceed or may exceed those from Bellefonte, the undue preference being of competitors at Bellefonte and Pleasant Gap, Pa., and localities accorded the Bellefonte basis.

Mr. Sullivan said the Commission should find the rates on lime and ground limestone from Bellefonte and Pleasant Gap to destinations in official territory not unreasonable. Reparation was sought only to the extent that the rates charged exceeded those from Bellefonte and Pleasant Gap.

The Commission was asked to prescribe rates on lime not in excess of the mileage scale found justified in Lime Between Southern Points, 129 I. C. C. 635, and on ground limestone not in excess of the scale prescribed by the Ohio Public Utilities Commission in No. 2327, known as the Ohio scale.

The examiner said the lime industry was a highly competitive one and that the rates from the origin territory considered and from competitive points were on a group basis. A readjustment of the rates from Bellefonte along the lines suggested, involving both increases and reductions, he said, would disrupt the long existing relationship among the competing groups. Furthermore, he said, the evidence did not prove that the rates from Bellefonte were unreasonable.

The carriers defended the adjustment on the ground that higher rates from branch line points and independent short line points were justified in many cases. The carriers contended that the rates from Bellefonte were either on a parity with or lower than those from competing groups. The examiner said that the argument that higher rates were warranted from branch line than main line points was made in Chemical Lime Co. vs. Bellefonte Central, 136 I. C. C. 333, in which the Commission gave points on the Bellefonte Central group rates on inbound traffic.—*Traffic World.*

Sand and Gravel to Iowa

RATES ON sand and gravel from Quincy, Ill., to points on the Burlington in southeastern Iowa have been found unreasonable by the Interstate Commerce Commission, division 3, in No. 20679, Traffic Bureau of Keokuk Chamber of Commerce et al. vs. C. B. & Q., for the present and future, to the extent they exceed or may exceed rates resulting from the application of the Iowa interstate distance scale, as extended in appendix A of the report to a maximum distance of 185 miles, to the short-line distances from Quincy to the respective destinations. The rates set forth in the appendix begin with 70 cents for 40 miles and over 35, and end with $1.49 for 185 and over 180 miles. The order for the future is effective on or before June 20. The report said the findings as to reasonableness would remove any undue prejudice that might exist.

Sand-Lime Brick Production and Shipments in May

THE following data are compiled from reports received direct from 23 producers of sand-lime brick located in various parts of the United States and Canada. The number of plants reporting is one less than those furnishing statistics for the April estimate published in the May 25 issue. The statistics below may be regarded as representative of the entire industry, the reporting plants having about one-half the production capacity in the United States and Canada.

Production remains about the same as in April, although three plants reported that they were not at present producing. Shipments by rail and truck remained about stationary. Stocks on hand decreased considerably as did unfilled orders.

The following are average prices quoted for sand-lime brick in May:

Average Prices for May

Shipping Point	Plant Price	Delivered
Boston, Mass.	$12.00	$16.00
Buffalo, N. Y.	12.25	16.50
Dayton, Ohio	12.50	15.50
Detroit, Mich.	13.00	15.50
Detroit, Mich.	.....	16.00
Flint, Mich.	.....	.....
Grand Rapids, Mich.	.....	.....
Hartford, Conn.	14.00	19.00
Jackson, Mich.	12.25	.....
Menominee, Mich.	11.00	13.50
Milwaukee, Wis.	10.50	13.00
Minneapolis, Minn.	10.00	12.75
Mishawaka, Ind.	11.00	.....
Pontiac, Mich.	12.50	15.50
Saginaw, Mich.	12.00	.....
San Antonio, Texas	.....	.....
Sebewaing, Mich.	.....	.....
Sioux Falls, S. D.	12.00	.....
Syracuse, N. Y.	18.00	20.00
Toronto, Canada	12.50	15.00
West Toronto, Can.	.....	14.00
Winchester, Mass.	.....	16.00
Winnipeg, Can.	.....	15.00

The following statistics are compiled from data received direct from 23 producers of sand-lime brick in the United States and Canada:

Statistics for April and May

	†April	*May
Production	16,154,923	12,969,276
Shipments (rail)	4,358,812	5,657,820
Shipments (truck)	13,579,953	13,106,797
Stocks	14,235,824	10,561,348
Unfilled orders	11,587,000	9,188,000

*Twenty-three plants reporting; incomplete, three plants not reporting production and stocks on hand, and ten plants not reporting unfilled orders.

†Twenty-four plants reporting; incomplete, seven plants not reporting unfilled orders.

Notes from Producers

Sioux Falls Pressed Brick Co., Sioux Falls, So. Dakota, report that the commissioners of Sioux Falls after testing out their manholes and finding them satisfactory, have given them exclusive contract for supplying the city with manholes.

A calendar blotter, carrying a striking view of the new Safety Building, and telling how sand-lime brick was used here after other brick had been tried and rejected, is being mailed this month by the Acme Brick Co., Milwaukee, Wis.

"A Short Story of Sand-Lime Brick" is the title of a very interesting booklet issued by the Paragon Plaster Co., Syracuse, N. Y. The booklet is exceptionally well illustrated, and as the foreword states, its purpose is to convey a greater understanding of what this brick is and its value as a building material.

A circular carrying a photograph of the Book-Cadillac Hotel, Detroit, as an example of the effective use of sand-lime brick, is being sent out by the combined Grande, Northern Indiana, Jackson and Saginaw brick companies.

Idaho Cement Plant Reported In Production

A. J. LINDSAY, secretary of the Idaho Portland Cement Co., Inkom, Idaho, near Pocatello, received word recently from E. J. Simons of Spokane, president of the company and in charge of the plant construction that the raw mill had started grinding early in May. Burning was to start later in the month and the first cement expected to be ready for delivery the latter part of June.

Eugene Enloe and N. J. Dolph of Spokane, large stockholders in the property, were added to the board at the recent annual meeting of Pocatello. Other officers and directors of the corporation, all Spokane men, are E. J. Simons, president; J. B. Maxfield, first vice-president; J. H. Neill, second vice-president; A. J. Lindsay, secretary; J. Thomas O'Brien, treasurer.

Mr. O'Brien will become sales manager after the finished plant begins operation. The plant has been financed, said Mr. Lindsay, all bills have been paid and discounts taken on most of the items. At the annual meeting it was agreed to change the preferred stock from 7% noncumulative to 7% cumulative, to increase the board of directors from seven to nine members, electing only seven at this time to change the principal place of business from Pocatello to Inkom, where the plant is located. In his report to stockholders, President Simons says:

"Construction work has been steady in spite of the severe weather during the winter and at present. The heavy machinery is about 95% placed. The piping and electrical work is being pushed as fast as possible; the quarry is opened and the track from the quarry to the crushers is in and the train of dump cars, drawn by the gasoline locomotive, has been employed. The entire quarry and crushing departments will be in operation soon.

"Two of the five big steel slurry tanks are completed and the other three will probably be finished within two weeks; our laboratory is equipped and in operation, thus enabling us to have a thorough and complete analysis made of each section of our opened quarry before operations start. Every unit of the plant is being completed as fast as possible and, with one or two exceptions, which, however disappointing, are usual in construction work, our schedule is being held to."—*Spokane* (Wash.) *Review.*

Sand-Lime Brick Production in 1928

THE DEPARTMENT OF COMMERCE announces that, according to data collected at the annual census of production and stocks of sand-lime brick, 313,553 thousands of such brick, valued at $3,654,590, were manufactured in the United States in 1928. The quantity represents decreases of 1.9% and 5.2%, respectively, as compared with 319,618 thousands reported for 1927 and 330,586 thousands for 1926, and the value shows an increase of 2/10 of 1% over $3,645,842 for 1927 and a decrease of 8.2% from $3,981,492 for 1926.

Stocks on hand December 31, 1928, amounted to 21,018 thousands, representing decreases of 16.2% and 4.6%, respectively, as compared with 25,075 thousands on hand at the end of 1927 and 22,033 thousands at the end of 1926.

For 1927, 47 establishments reported production of sand-lime brick, the decrease to 41 for 1928 being the net result of a loss of eight establishments and a gain of two new establishments. Of the eight establishments lost, five were idle throughout the year, two had gone out of business before the beginning of 1928 and one reported the production of brick other than sand-lime brick.

The following statement shows the production and stocks on hand:

SANDLIME BRICK PRODUCED IN 1928

State	Number of establishments	Production: Quantity (thousands)	Production: Value	Stocks on hand December 31 (thousands)
United States:				
1928	41	313,553	$3,654,590	21,018
1927	47	319,618	3,645,842	25,075
1926	42	330,586	3,981,492	22,033
States, 1928:				
Florida	3	6,327	57,866	185
Michigan	12	103,056	1,270,778	5,854
Other States:*				
Connecticut, District of Columbia, Massachusetts and New Jersey	7	86,203	970,114	6,183
Louisiana and Texas	3	6,289	78,612	525
Minnesota and Missouri	3	18,011	177,138	2,416
Indiana, New York, Ohio and Pennsylvania	8	67,185	818,031	3,875
California, South Dakota, Utah and Wisconsin	5	26,482	282,051	1,980

*California, 1 establishment; Connecticut, 1; District of Columbia, 1; Indiana, 1; Louisiana, 1; Massachusetts, 2; Minnesota, 2; Missouri, 1; New Jersey, 3; New York, 4; Ohio, 2; Pennsylvania, 1; South Dakota, 1; Texas, 2; Utah, 1; Wisconsin, 2.

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Utilizing the Surplus Sizes of Sand

Lewis Cement Block Co. Takes Its Aggregate from the Discarded Concrete Sand of Several Indianapolis Producers

THE LEWIS CEMENT BLOCK CO. is one of the oldest cement products manufacturing companies in the Indianapolis territory, having been engaged in that business for the past nine years. Its entire operation was formerly conducted across the river from the newer plant, but owing to the more advantageous location, the older plant was moved to the present site located at 14th St. and Fall Creek, about halfway between the two sand and gravel plants of the Indiana Gravel Co., Inc.

Until recently the Lewis company used as its source of aggregate, a coarse concrete sand that the gravel company had practically discarded. In the washing plant of the Indiana Gravel Co. the surplus coarse sand material was sluiced into an abandoned gravel pit and it was this product which was one of the chief reasons for the Lewis Cement Block Co. moving its plant. This material was reclaimed by installing a Sauerman slackline cableway with a Crescent type ⅓-yd. bucket to carry the "grits" into the plant.

Part of the storage yard, Lewis Cement Block Co., Indianapolis. The plant office shows in the background

The large amount of material in this pit was thought to be sufficient to run the plant for a score of years, but the volume of business grew to such an extent that all the material that had accumulated in this pit has been used up, so that now the grits must be hauled to the block plant by truck from other locations. The concrete sand-grits are secured from neighboring gravel plants as needed, in a fairly dry condition, and dumped on the level ground near and alongside of the plant in such a manner that the same slackline installation can be used to deliver the sand into the plant proper. The grits are dragged up a frame-constructed, metal-lined incline to an opening in the roof of the plant, through which the material falls to the floor alongside of the two Besser block machines. The slackline is driven by a 15-hp. motor and the installation has proved to have sufficient capacity to deliver to the plant in a few minutes all the aggregates that is needed for several hours' running. The plant foreman simply runs the dragline from time to time and keeps the plant supplied with grits without interfering with his regular duties.

The grits are shoveled from the floor into the mixer feed hopper (the mixer holding 7 cu. ft.) and the bagged cement added. Most of the cement products are made using a 6 to 1 mix and with just sufficient water to make a proper molding consistency.

The tile after formation in the strippers are carried by laborers and piled in convenient places in the mill proper, and when sufficiently hardened for safe handling they are transferred to the yard and frequently sprayed with water from a hose until thoroughly cured before being sold.

There are two automatic strippers, each having a capacity of 1800 blocks per day, and each driven by individual 10-hp. motors.

All sacks are cleaned in a Baler Co., Marion, Ohio, bag cleaner that has a capacity of 40 empty sacks. The machine is of the tumbling barrel type and, while of sufficient capacity for most cement products plants, takes up only a very small floor space and can be shifted to any convenient location, as the ¼-hp. motor is mounted on the frame of the cleaner itself. The machine is well designed and constructed.

The company also maintains a small plant for the manufacture of art or decorative stone, and keeps a sufficient stock of such ornamental concrete items as lawn seats, vases, urns, flower boxes, etc. In addition, several different styles of porch columns and porch rail pedestals are carried in stock.

The cement tile output is marketed through an agreement with the Indianapolis Coal Co., which takes all that the plant produces, but the ornamental cast stone is marketed by the Lewis Cement Block Co.

The offices of the company are at the plant, 929 West 14th St. L. W. Lewis is president; J. E. Johnson, secretary and treasurer; J. W. McKinney, manager, and J. H. Charles is superintendent.

The building in which the decorative stone is made is in a separate structure near the plant office.

A large stock of tile is carried on hand at all times, the various kinds and shapes being piled over a considerable area imme-

"Green" cement block curing inside the plant

diately surrounding the plant. Also the tile after the preliminary curing inside the main mill are stored in this yard,, making a rather imposing appearing yard as the piles cover no small area.

New Gravel Company to Work Leshara, Neb., Deposits

INCORPORATION PAPERS for the Platte Sand and Gravel Co., with headquarters in Fremont, Neb., are reported to have been filed at the county clerk's office. Charles H. Yost and Carl A. Manska are the incorporators, but a group of Omaha and Fremont business men, whose names were not announced, are said to also be interested. Capital stock is listed at $35,000.

Work is beginning at once to prepare the company's gravel pits one and one-half miles north of Leshara. Grading was begun quite recently for trackage connecting with the Chicago, Burlington and Quincy right-of-way. Equipment is being moved to the pits immediately and as soon as the track is laid, sand will be pumped.

The company has a large tract of land under lease. The stock will be divided into 350 shares at $100 each, one-half of which is to be subscribed when business is started. *Fremont* (Neb.) *Tribune.*

Concrete grits are reclaimed by a slackline cableway system

The slackline bucket taking a load of grits up the incline to the plant

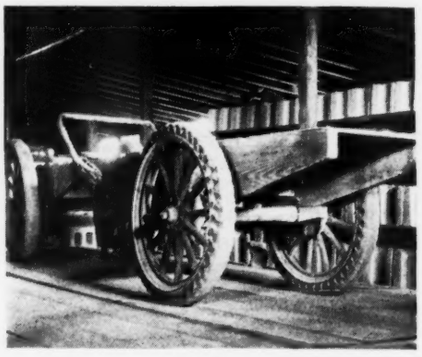
Plan Bauxite Cement Mill

THE BEOCSIN CEMENT CO. and the Hungarian Universal Coal Mining Co. plan to erect a bauxite cement plant in Czecho-Slovakia at a cost of about 50,000,000 Czech kronen. A new bauxite deposit estimated to contain about 80,000,000 tons of ore is reported near Budapest, Hungary.

Northwest Products Men to Test Their Concrete Pipe

THE PRINCIPAL manufacturers of concrete pipe in Western Washington have formed an organization, which will direct its efforts toward testing and guarding the quality of concrete pipe made by its members, and toward enlarging the market for their products by acquainting the public with its merits and special adaptations.

C. M. Howard of Tacoma, Wash., has been engaged as active representative. He will visit each member plant, inspect their product, and will call on city and county engineers and others in the vicinity interested in the purchase and use of concrete pipe. Mr. Howard has had a large and active experience along this line.



Rubber-tired buggy hauling cement block from inside to outside curing

The members of this group are also members of the Northwest Concrete Products Association. It is expected that the manufacturers of concrete pipe in Oregon and also in eastern Washington will form a similar organization.

Concrete Foundation Walls and Basements

"FOUNDATION Walls and Basements of Concrete" is the title of a recent publication by the Portland Cement Association.

The reader will find helpful information on the subjects of computing dimensions for footings, designs of foundation walls, loading on wall footings and posts, suggestions for building foundation wall and retaining wall forms. The selection of proper aggregates for good concrete, the proper proportioning and mixing is also explained, as well as information on curing concrete and cement and cold weather concreting. It also illustrates methods for making water tight basement floors and walls and preparations for providing proper drainage of surface water about structures. Space is also given the subject of estimating quantities of cement, fine and coarse aggregate for foundation walls and basement floors.

A copy of the book may be had upon application to the P.C.A. or any of its offices.

Arnold and Weigel, Incorporated

THE WELL-KNOWN firm of lime plant engineers and contractors, Arnold and Weigel, Woodville, Ohio, is to be perpetuated as a corporation. The interests of Valentine Arnold have been purchased, and Alton A. Weigel becomes president of the new corporation, chartered in Ohio.

The new organization brings together a group of men whose knowledge of engineering, construction, research, processing, consulting and chemistry is exceptionaly developed to enable a thorough and complete service, covering original surveys of property sites, testing, analyzing, working out processing, engineering and construction features from the undeveloped project to the completed plant.

The new organization will continue to handle the same types of equipment as did the former Arnold and Weigel partnership featuring, namely, the "Arnold" vertical kiln, the "Ward" automatic coal feeders for externally fired lime kilns," "A & W" pneumatic draw shears, the large and small type "Weber" batch type lime hydrators and the "McGinty" shaking grates for lime kilns.

The engineering department is equipped to prepare the design, detail plans and specifications for modern lime calcining and hydrating plants of either the vertical or rotary kiln types. The work of corporation has been broadened to include designs, working drawings and specifications for any special kiln construction or lime machinery, as well as a complete consulting service in the lime and stone byproducts industry.

This company owns and operates its own experimental lime plant, especially equipped for industrial developments. This plant is unique in the fact that it is equipped with reduced size apparatus, capable for producing manufacturing conditions and products in exactly the same manner as a full sized plant would produce in commercial operation. It has thus been possible to study raw materials and finished products, preliminary to final construction of new plants, especially in the development of new fields. The company is also prepared to make technical and practical researches into the developments of the lime industry and its allied relations. A new laboratory has been established for chemical and physical control.

The personnel of the company is as follows: A. A. Weigel, president and general manager; H. W. Hess, vice-president and consulting chemical engineer; R. H. Sandwisch, secretary-treasurer; A. J. Henkey, chief engineer; H. J. Pinder, assistant chief engineer; R. B. Eversole, field engineer.

Executive and engineering personnel of Arnold and Weigel, Inc.

Best Bros. Keene's Cement Co. Celebrates Its 40th Birthday

THE Best Bros. Keene's Cement Co., Medicine Lodge, Kan., has just been celebrating the fortieth anniversary of the founding of the company. An interesting broadside issued by the company gives some of its history, including the following:

"The upper story of the Best Bros.' first mill was a frame structure built on a stone foundation. At the side of the mill was a Krantz patent kiln, 8 ft. in diameter and 17 ft. high. The mill equipment consisted of a crusher and a nipper operated by steam power. These crude machines worked like coffee mills. The gypsum was hauled from the hills to the factory in slow-moving horse-drawn wagons. Production was limited."

Other descriptive matter in the large folder shows the present mill of the company located just at the west edge of Medicine Lodge, with an inset showing the first mill built 40 years ago on the same site now occupied by the present mills. The Barber county gypsum deposits, the quarries at Sun City, the aerial tramway, and some interior views of the mills are also shown.

A recent shipment of cement went to New Zealand and another went to Cuba.

Portland Cement Output in May

Production and Shipments Less Than in May, 1928— Stocks Show Increase of 13.9% Over Same Date

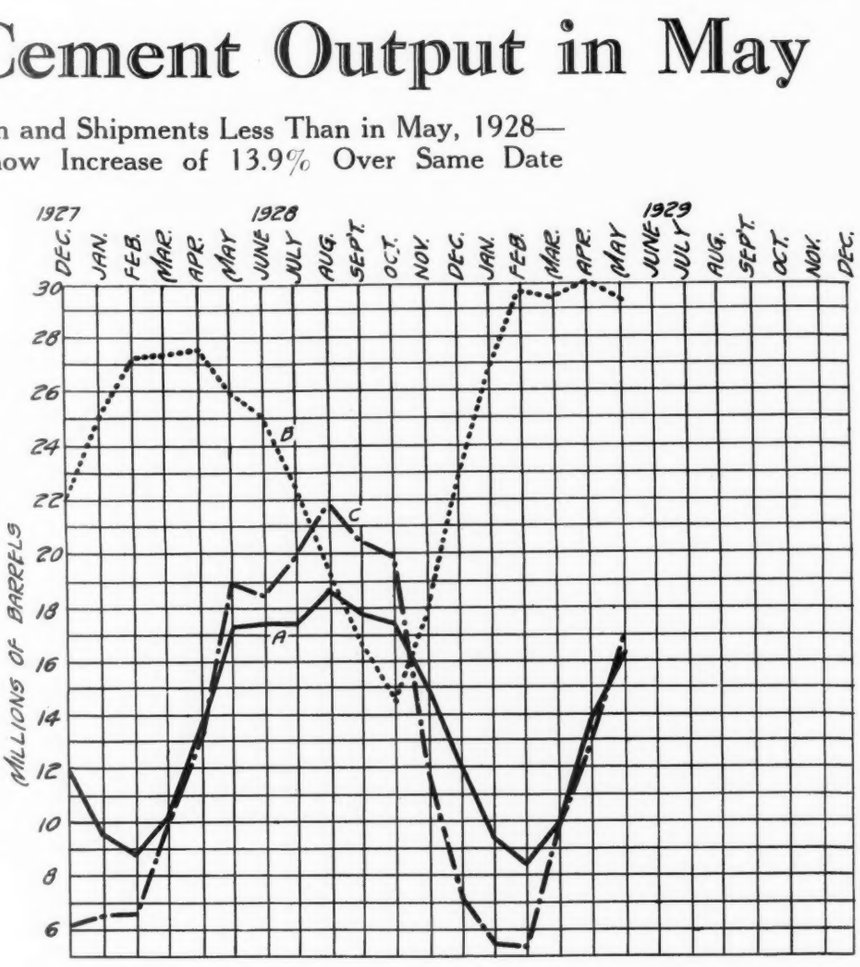
THE PORTLAND cement industry in May, 1929, produced 16,151,000 bbl., shipped 16,706,000 bbl. from the mills, and had in stock at the end of the month 29,597,000 bbl., according to the United States Bureau of Mines, Department of Commerce. The production of portland cement in May, 1929, showed a decrease of 6.7% and shipments a decrease of 12%, as compared with May, 1928. Portland cement stocks at the mills were 13.9% higher than a year ago.

The output of two new plants, located respectively in Nebraska and Wyoming is included in the statistics here presented which are compiled from reports for May, from all manufacturing plants except two for which estimates have been included in lieu of actual returns.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 161 plants at the close of May, 1929, and of 157 plants at the close of May, 1928. In addition to the capacity of the new plants which began operating during the 12 months ended May 31, 1929, the estimates include increased capacity due to extensions and improvements at old plants during the period.

RELATION OF PRODUCTION TO CAPACITY

	May 1928 Pct.	May 1929 Pct.	April 1929 Pct.	Mar. 1929 Pct.	Feb. 1929 Pct.
The month	86.6	76.4	67.1	47.4	44.8
12 months ended	73.9	70.2	71.1	70.9	71.0


1927
1928
1929
DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
MILLIONS OF BARRELS
30 28 26 24 22 20 18 16 14 12 10 8 6
A
B
C

(A) Stocks of finished portland cement at factories; (B) Production of finished portland cement; (C) Shipments of finished portland cement from factories

Distribution of Cement

The following figures show shipments from portland cement mills distributed among the states to which cement was shipped during the months of March and April, 1928 and 1929.

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES IN MARCH AND APRIL, 1928 AND 1929, IN BARRELS*

Shipped to	1928—March	1929	1928—April	1929
Alabama	282,379	127,916	233,865	166,925
Alaska	264	525	542	1,778
Arizona	81,586	57,406	64,808	51,150
Arkansas	101,428	93,133	86,513	99,392
California	937,253	1,063,895	1,058,739	973,052
Colorado	60,381	59,854	90,312	99,991
Connecticut	113,752	106,492	187,697	158,919
Delaware	19,230	19,112	26,177	31,219
District of Columbia	62,160	86,492	66,108	97,218
Florida	114,798	100,388	134,647	101,227
Georgia	157,171	95,061	155,787	139,353
Hawaii	39,411	22,366	19,314	24,308
Idaho	23,994	20,842	30,832	26,923
Illinois	700,881	612,069	1,192,251	1,069,018
Indiana	232,338	251,934	355,434	365,104
Iowa	149,705	123,637	405,654	215,629
Kansas	194,957	217,559	202,705	285,944
Kentucky	103,113	102,241	130,168	163,059
Louisiana	115,669	104,285	112,667	105,290
Maine	18,704	19,229	30,015	34,197
Maryland	123,334	131,729	176,807	169,575
Massachusetts	160,730	165,380	256,150	225,829
Michigan	433,110	474,902	710,731	785,443
Minnesota	128,332	136,193	185,901	220,077
Mississippi	73,937	75,353	73,651	76,425
Missouri	333,221	342,697	383,704	405,208
Montana	27,231	20,068	32,676	49,313
Nebraska	88,491	88,438	108,224	106,392
Nevada	7,568	9,755	7,195	10,848
New Hampshire	25,575	32,824	34,667	42,936
New Jersey	505,016	485,067	778,746	689,358
New Mexico	30,606	25,796	27,664	33,100
New York	1,237,218	1,285,742	1,758,888	1,597,182
North Carolina	209,006	159,570	199,340	224,791
North Dakota	18,274	16,912	34,627	62,207
Ohio	540,347	564,820	776,992	849,359
Oklahoma	294,206	318,321	209,850	309,739
Oregon	78,121	†80,134	102,480	79,593
Pennsylvania	657,006	715,616	928,060	959,640
Porto Rico	1,329	420	0	975
Rhode Island	47,707	43,300	81,029	65,457
South Carolina	119,612	100,091	101,838	131,517
South Dakota	25,694	32,110	42,599	40,519
Tennessee	174,774	140,815	216,928	231,259
Texas	546,960	621,387	526,063	694,150
Utah	35,955	28,712	36,932	46,663
Vermont	14,737	24,984	27,791	33,851
Virginia	173,697	138,772	175,192	176,266
Washington	162,335	†214,280	237,749	255,250
West Virginia	81,273	70,720	103,682	93,098
Wisconsin	148,969	197,738	287,693	352,986
Wyoming	13,571	7,672	15,229	12,491
Unspecified	57,761	†29,029	41,738	23,846
	10,084,877	10,063,783	13,265,051	13,265,039
Foreign countries	50,123	49,217	41,949	59,961
Total shipped from cement plants	10,135,000	10,113,000	13,307,000	†13,325,000

*Includes estimated distribution of shipments from three plants each month. †Revised.

PRODUCTION AND STOCKS OF CLINKER, BY MONTHS, IN 1928 AND 1929, IN BARRELS

Month	1928—Production	1929	Stock at end of month 1928	1929
January	11,839,000	12,041,000	9,672,000	9,642,000
February	11,363,000	11,255,000	12,237,000	12,436,000
March	12,501,000	12,450,000	14,463,000	14,948,000
April	13,844,000	*14,166,000	15,002,000	*15,472,000
May	16,025,000	15,445,000	14,329,000	14,905,000
June	15,940,000		12,944,000	
July	15,981,000		11,707,000	
August	16,202,000		9,357,000	
September	15,909,000		7,566,000	
October	15,782,000		5,944,000	
November	14,930,000		5,953,000	
December	13,426,000		7,422,000	

*Revised. †The inclusion of Wyoming begins with April, 1929.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN MAY, 1928 AND 1929, AND STOCKS IN APRIL, 1929, IN BARRELS

District	Production 1928—May—1929		Shipments 1928—May—1929		Stocks at end of May 1928	1929	Stocks at end of Apr. 1929*
East'n Penn., N. J. and Md.	3,823,000	3,541,000	4,200,000	3,967,000	6,153,000	6,355,000	6,781,000
New York and Maine	1,291,000	1,137,000	1,239,000	1,184,000	1,899,000	2,195,000	2,242,000
Ohio, West'n Penn., W. Va.	1,812,000	1,595,000	1,898,000	1,660,000	3,482,000	3,711,000	3,777,000
Michigan	1,280,000	1,387,000	1,507,000	1,322,000	2,240,000	2,724,000	2,659,000
Wis., Ill., Ind. and Ky.	2,384,000	2,065,000	2,793,000	2,356,000	3,011,000	4,052,000	4,343,000
Va., Tenn., Ala., Ga., Fla., La.	1,337,000	1,276,000	1,500,000	1,301,000	1,888,000	2,090,000	2,114,000
East'n Mo., Ia., Minn., S.D.	1,766,000	1,548,000	2,143,000	1,649,000	3,524,000	4,261,000	4,362,000
West'n Mo., Neb., Kan., Okla.	1,188,000	1,117,000	1,181,000	1,007,000	1,573,000	1,527,000	1,416,000
Texas	531,000	655,000	610,000	563,000	389,000	535,000	443,000
Colo. Mont., Utah & Wyo.†	311,000	363,000	267,000	334,000	510,000	521,000	492,000
California	1,175,000	1,142,000	1,235,000	1,066,000	869,000	997,000	921,000
Oregon and Washington	410,000	325,000	413,000	297,000	446,000	629,000	601,000
	17,308,000	16,151,000	18,986,000	16,706,000	25,984,000	29,597,000	30,151,000

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1928 AND 1929, IN BARRELS

Month	1928—Production—1929		1928—Shipments—1929		Stocks at end of month 1928	1929
January	9,768,000	9,881,000	6,541,000	5,707,000	25,116,000	26,797,000
February	8,797,000	8,522,000	6,563,000	5,448,000	27,349,000	29,870,000
March	10,223,000	9,969,000	10,135,000	10,113,000	27,445,000	29,724,000
April	13,468,000	*13,750,000	13,307,000	*13,325,000	27,627,000	*30,151,000
May	17,308,000	16,151,000	18,986,000	16,706,000	25,984,000	29,597,000
June	17,497,000	.....	18,421,000	.....	25,029,000	.....
July	17,474,000	.....	19,901,000	.....	22,580,000	.....
August	18,759,000	.....	21,970,000	.....	19,374,000	.....
October	17,533,000	.....	19,836,000	.....	14,579,000	.....
September	17,884,000	.....	20,460,000	.....	16,799,000	.....
November	15,068,000	.....	11,951,000	.....	17,769,000	.....
December	12,189,000	.....	7,384,000	.....	22,650,000	.....
	175,968,000	.....	175,455,000	.....	.....	.....

PRODUCTION AND STOCKS OF CLINKER (UNGROUND CEMENT), BY DISTRICTS, IN MAY, 1928 AND 1929, IN BARRELS

District	1928—Production—1929		Stocks at end of month 1928	1929
Eastern Pennsylvania, New Jersey and Maryland	3,650,000	3,463,000	2,267,000	2,616,000
New York and Maine	1,192,000	1,089,000	1,042,000	1,382,000
Ohio, Western Pennsylvania and West Virginia	1,686,000	1,591,000	1,903,000	1,804,000
Michigan	1,270,000	1,229,000	1,879,000	1,376,000
Wisconsin, Illinois, Indiana and Kentucky	1,857,000	1,946,000	2,012,000	2,356,000
Virginia, Tenn., Alabama, Georgia, Florida, La.	1,247,000	1,144,000	964,000	1,225,000
Eastern Missouri, Iowa, Minnesota, South Dakota	1,596,000	1,491,000	1,011,000	1,157,000
Western Missouri, Nebraska, Kansas, Oklahoma	1,098,000	1,094,000	580,000	751,000
Texas	546,000	617,000	179,000	188,000
Colorado, Montana, Utah & Wyoming†	285,000	323,000	421,000	533,000
California	1,243,000	1,067,000	1,437,000	933,000
Oregon and Washington	355,000	391,000	634,000	584,000
	16,025,000	15,445,000	14,329,000	14,905,000

Exports and Imports

(Compiled from the records of the Bureau of Foreign and Domestic Commerce and subject to revision)

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES IN APRIL, 1929

Exported to	Barrels	Value
Canada	4,813	$26,216
Central America	13,186	35,709
Cuba	14,335	30,104
Other West Indies and Bermuda	3,917	9,543
Mexico	4,489	15,294
South America	19,333	77,225
Other countries	4,072	24,225
	64,145	$218,316

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES AND BY DISTRICTS, IN APRIL, 1929

Imported from	District into which imported	Barrels	Value
Belgium	Florida	1,000	$ 961
	Massachusetts	23,656	28,966
	New Orleans	4,170	5,044
	New York	6,250	7,241
	Oregon	6,000	6,781
	South Carolina	10,000	12,073
	Total	51,076	$ 61,066
Canada	Maine and N. H.	6	$ 19
Denmark	New York	9,124	$ 9,497
	Porto Rico	13,160	19,227
	Total	22,284	$ 28,724
Germany	Los Angeles	1,000	$ 2,443
United K'gd'm	New York	15,302	$ 22,029
	Grand total	89,668	$114,281

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII AND PORTO RICO, IN APRIL, 1929

	Barrels	Value
Alaska	1,662	$ 4,994
Hawaii	24,248	55,000
Porto Rico	1,272	3,100
	27,182	$63,094

Omaha Likes L. T. Sunderland

LESTER T. SUNDERLAND, president, and J. A. Sunderland, vice-president of the Ash Grove Lime and Portland Cement Co., builders of the new Louisville, Neb., cement plant, have long been identified with Omaha business.

J. A. Sunderland has been a resident of Omaha for 46 years.

L. T. Sunderland first came to Omaha in 1887, after leaving the Pillsbury academy at Owatonna, Minn., at the age of 19. But he was a man of the business world before he entered the academy. At 13 he was clerk in a coal office at Ottumwa, Ia., and at 15 he was manager.

When the office of the Whitebreast Coal and Mining Co. was moved from Ottumwa to Chicago, he became assistant to the secretary and treasurer. He resigned to enter the academy.

When L. T. Sunderland first came to Omaha, his brother, J. A., had been here four years, and was secretary of the Omaha Coal, Coke and Lime Co.

L. T. Sunderland organized a branch in South Omaha, known as L. T. Sunderland & Co. In 1889 J. A. Sunderland was elected president of the company, and four years later the name was changed to Sunderland Bros. Co.

In 1909, L. T. Sunderland accepted the position of vice-president of the Ash Grove Lime and Portland Cement Co., with general offices in Kansas City.

He still remained vice-president of Sunderland Bros. Co., but his active interest was required entirely in the cement business.

In 1920 he was president of the Portland Cement Association, and under his administration the publicity activities of the association were inaugurated, and a general educational bureau for education of the public regarding portland cement was organized.—*Omaha* (Neb.) *Bee-News.*

Output of Masonry, Natural, and Puzzolan Cements Increased in 1928

STATISTICS of hydraulic cements, other than portland cement, in 1928, which include masonry, natural, and puzzolan cements, as compiled by the United States Bureau of Mines, Department of Commerce, show that the production—2,210,404 bbl.—exceeded that of 1927 by over 4%. Shipments of these cements from mills in 1928 increased over 2% in quantity and over 1% in gross value. Stocks at the mills decreased and were about 2% lower at the end of 1928 than at the end of 1927.

These statistics represent the output of 11 plants, which are located as follows: One each in Alabama, Illinois, Indiana, Kansas, Kentucky, Ohio and Pennsylvania; and two each in Minnesota and New York.

The output has been expressed in terms of 376-lb. barrels to correspond with the statistics of portland cement.

MASONRY, NATURAL, AND PUZZOLAN CEMENTS PRODUCED, SHIPPED AND IN STOCK IN THE UNITED STATES, 1927–1928*

Year	Production Barrels	Shipments Barrels	Value	Stock (Dec. 31) Barrels
1927	2,123,868	2,158,323	$2,881,029	143,854
1928	2,210,404	2,213,645	2,910,097	140,613

*Eleven active plants.

EXPORTS AND IMPORTS OF HYDRAULIC CEMENT, BY MONTHS, 1928 AND 1929

Month	1928—Exports—1929 Barrels	Value	Barrels	Value	1928—Imports—1929 Barrels	Value	Barrels	Value
January	56,400	$204,875	78,639	$283,002	234,753	$342,797	151,302	$177,976
February	62,828	221,620	58,886	225,590	164,408	217,525	118,930	123,123
March	74,983	265,719	69,079	235,164	235,930	330,074	131,909	112,788
April	61,676	205,882	64,145	218,316	249,458	324,371	89,668	114,281
May	70,173	236,005	.....	.....	190,509	256,872	.....	.....
June	59,536	201,313	.....	.....	266,537	359,637	.....	.....
July	83,759	291,055	.....	.....	112,887	151,877	.....	.....
August	88,736	302,866	.....	.....	259,988	358,858	.....	.....
September	71,995	252,843	.....	.....	173,439	226,295	.....	.....
October	62,137	246,010	.....	.....	152,210	226,909	.....	.....
November	69,313	260,310	.....	.....	67,240	92,468	.....	.....
December	63,120	250,204	.....	.....	175,992	233,300	.....	.....
	824,656	$2,938,702	.....	.....	2,283,351	$3,120,983	.....	.....

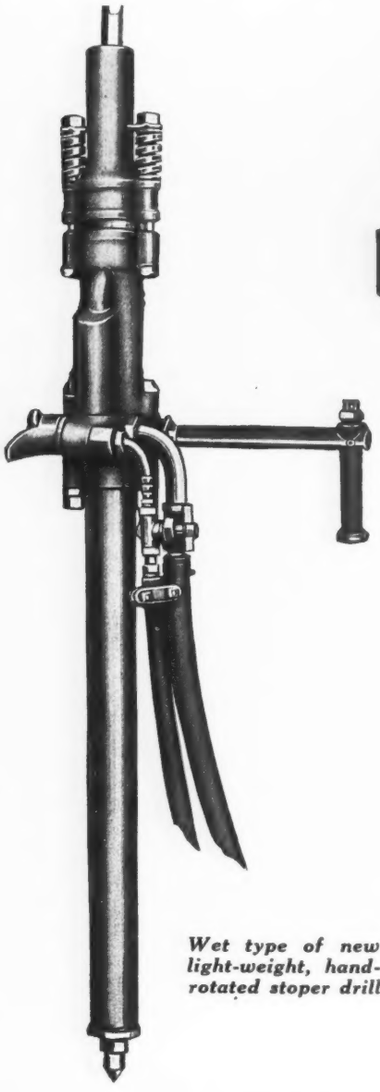
New Machinery and Equipment

Hand-Rotated Stopers

CHICAGO PNEUMATIC Tool Co., New York, has just introduced the CP-146 stoper drill, built in the wet and dry types. This drill, it is said, has been tested under widely varying conditions and found to give satisfactory results.

The weight of the drill is given at from 5 to 8 lb. Feed control is air-operated and located in the rotation handle. The tubular valve is housed in renewable bushings in the cylinder walls and the exhaust is piston-controlled thus eliminating, it is claimed, any tendency to "freeze." Travel feed is 24 in. facilitating steel change and all air and water swivel connections are conveniently located. Moving parts are automatically lubricated.

Being full cushioned and valve actuated, it is claimed to be able to perform satisfactorily under possible poor conditions —low air pressure, wet air or worn parts.

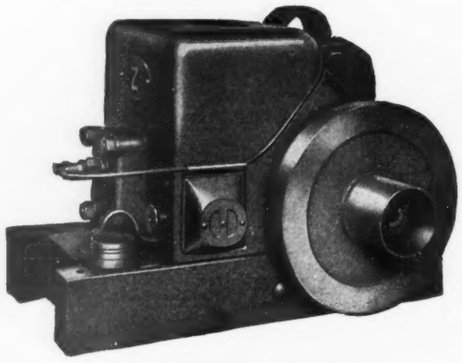


Wet type of new light-weight, hand-rotated stoper drill

New Portable Engines

A NEW LINE OF gasoline-kerosene engines in ratings from 1½ to 7½ hp. recently announced by Fairbanks, Morse & Co., incorporate a number of interesting features. While the most radical departure from previous construction is in the all-enclosed self-oiling feature, the new engine is quite different in appearance from other small engines of its type.

The 1½-hp. rating, which is a size used in a wide diversity of drives such as portable pumps, air compressors, generator saws, grinders, and similar uses, is the most interesting development in the new line. It is less than 16 in. high, 22 in. long and 19 in. wide and weighs 150 lb.



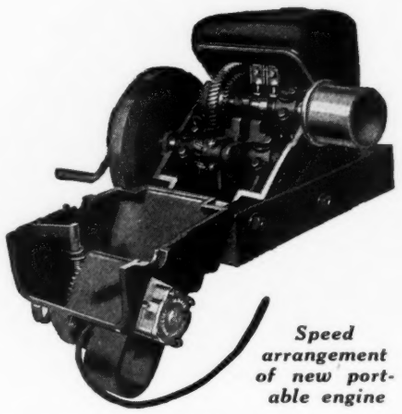
Totally enclosed portable engine

Two pulleys are provided, one of which operates at the engine speed of 1500 r.p.m. and the other at 750 r.p.m. There is also a mechanical regulator which permits slowing the engine down to 1100 r.p.m. with, of course, proportionate reduction in horsepower. With the two pulley speeds and the speed regulator it is possible to meet the requirements of almost any type of drive.

New Deep Well Turbines

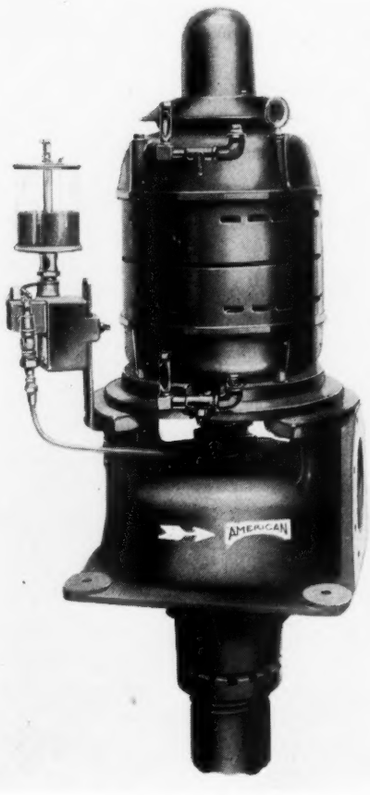
THE American Well Works, Aurora, Ill., announces its new 6-in. and 8-in. deep well turbines. The deep well turbine consists of the turbine head proper, which is the driving unit, the supporting pipe, which encloses the driving shaft, and the turbine itself, which consists of the number of stages necessary for the specific requirements.

The turbine head consists of the vertical motor mounted on a rigid and compact base; the thrust bearing of the motor is designed to carry the load of the line shaft and impellers. To the turbine head is attached the supporting pipe, to the lower end of which is attached the turbine proper.



Speed arrangement of new portable engine

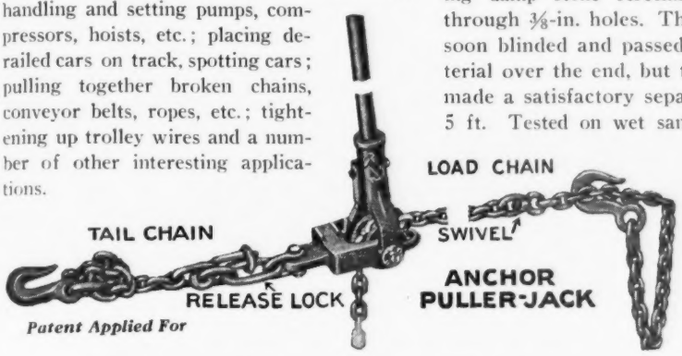
All bearings are oil lubricated by gravity feed from the surface, the gravity feed being electrically controlled. Provision is made for complete drainage of all waste oil and water leakage and the discharge pipe is located above the floor level, for easy access.



New deep well turbine

New Puller-Jack

THE "ANCHOR" PULLER-JACK, a device with a wide variety of uses about rock products plants, is announced by T. H. Edeblute Co., Pittsburgh, Penn. For most purposes, the puller-jack does the work of chain hoists, lifting jacks, winches and block and tackle, the manufacturers state. As instances of its application, the makers give the following uses: Track shifting; handling and setting pumps, compressors, hoists, etc.; placing derailed cars on track, spotting cars; pulling together broken chains, conveyor belts, ropes, etc.; tightening up trolley wires and a number of other interesting applications.



The "puller-jack," a new general utility tool

The standard outfit consists of the machine itself with 3-ft. steel handle, 15-ft. load chain with slip-hook and swivel, 3½-ft. tail chain with grab hook, and sheave block. The chains are special-made of high carbon steel, full $\frac{7}{16}$-in. heat treated, provided with a high factor of safety and guaranteed by the manufacturers not to stretch out of shape. Other lengths than the 15 ft. of chain can be supplied.

The device can be operated in any position—lever upright, upside down, sideways or with the level pull toward the load or from it. Action is quite simple and the machine easily operated by one man, it is stated. A sheave block is included in standard equipment; used to double the pulling power, or in making vertical lifts, pulling around corners, or in cramped quarters.

According to certified tests by the Pittsburgh Testing Laboratory, one man with the machine made a straight line pull of 4800 lb. and two men, 6500. With the sheave block, one man pulled 6700 lb. and two men 9800 lb.

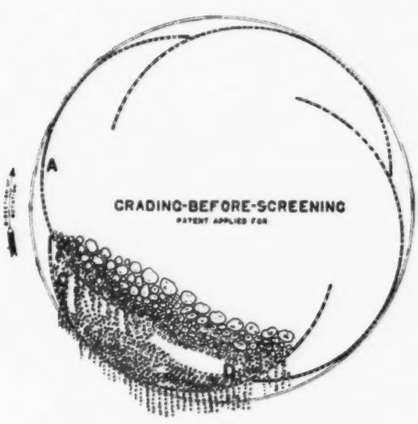
Improved Rotary Screen

ORDINARY ROTARY SCREENS have a rather low capacity per square foot of surface and give trouble with blinding, especially when the finer sizes of damp material are screened. Both these defects seem to be partly overcome in the screen made by W. A. Hiscox, Ltd., Derby, England. The construction of the Hiscox screen is shown in the accompanying illustrations. Instead of a continuous cylindrical screen surface there are three overlapping screen plates arranged so that the material will cascade from one to the other as the screen revolves. It is claimed that this prevents coarse pieces from covering the fine holes, gives the necessary churning action to prevent the fines from riding on top of the coarse, and protects the holes from blinding.

An article in the English cement paper, *Cement, Lime and Gravel*, says that a 3-ft. screen, 6 ft. long, of this type was tried in competition with a screen of the ordinary type of the same dimensions, screening damp stone screenings and chippings through ⅜-in. holes. The ordinary screen soon blinded and passed most of the material over the end, but the Hiscox screen made a satisfactory separation in the first 5 ft. Tested on wet sand which contained considerable clay, the ordinary screen would not screen it at all, but the Hiscox screen made a good separation after "knockers" were put on to keep the holes open.

The tonnage passed in these tests is not given. In another test mentioned in the article a Hiscox screen 3 ft. in diameter and 15 ft. long screened 15 tons per hour of dry basalt screenings to 20-mesh, ⅛-in., ⅜-in., and ½-in. products. With the addition of a spray pipe, the screen is said to give exceptionally good results as a sand and gravel washer and this should be so as the action is the same as that of the ordinary rotary washer which is often used to precede screens.

Apparently the screen is not intended to be used on the coarser sizes as the article referred to says that it precedes the ordinary plate screens, and that the coarse material is rapidly passed to these by the cascading action.



New rotary screen for sizing finer sizes of damp materials

Rubber Mounted Motors

WAGNER ELECTRIC CORP., St. Louis, Mo., announces a new motor—the RAR—a new development in motor design, developed especially for applications requiring

Improved type of rotary screen

ultra-quiet performance. The motor proper is completely insulated from the supporting cradle-shaped base by means of rubber bushings. The entire outfit is said to be practically rigid, and the shaft alignment is in no way endangered. There is no change in overall length and width dimensions.

The motor is of the brush-lifting type said to insure quietness in operation and also prolong the life of commutator and

Rubber-mounted electric motor

brushes. Other alterations to further improve quietness and electrical performance are the equipping of governor weights with rubber bumpers and redesign of the rocker arm to eliminate brush noises.

Half-Size Hydrator for Small-Capacity Lime Plants

ARNOLD & WEIGEL, Woodville, Ohio, has announced a half-ton batch-type lime hydrator, known as the "Weber, Jr." for use by producers who require only a small tonnage of hydrated lime and where initial investments do not require major equipment or large capacities.

The company states that the "Weber, Jr." embraces all the construction features of the large "Weber" hydrator. It is a simple compact unit, giving, it is said a uniform quality and thorough mix, and operates automatically when once the proper proportion of lime and water are determined.

The capacity of the "Weber Jr." is rated at 2 tons of hydrated lime per hour, or four ½-ton batches. It is electrically driven through a speed reducer direct-connected to the main shaft of the hydrator.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., at producing point or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Chaumont, N. Y.	.50	1.75	1.75	1.50	1.50	1.50
Chazy, N. Y.	.75	1.75	1.60	1.30	1.30	1.30
Dundas, Ont.	.53	1.05	1.05	.90	.90	.90
Farmington, Conn.	.....	1.30	1.10	1.00	1.00	.....
Frederick, Md.	.50– .75	1.35–1.45	1.15–1.25	1.10–1.20	1.05–1.15	1.05–1.10
Ft. Springs, W. Va.	.40	1.35	1.35	1.30	1.25	1.15
Munns, N. Y.	.75	1.25	1.25	1.15	.....	.....
Prospect, N. Y.	.80	1.20	1.20	1.15	1.10	.....
Rochester, N. Y.—Dolomite	1.50	1.50	1.50	1.50	1.50	1.50
St. Vincent de Paul, Que. (n)	.65	1.25	1.05	.95	.90	1.00
Syracuse, N. Y.	.50	1.00	1.00	1.00	1.00	1.00
Walford, Penn.	.....	.....	1.35h	1.35h	1.35h	1.35h
Watertown, N. Y.	1.00	1.75	1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL:						
Afton, Mich.	.....	.....	.....	.50	.....	1.50
Alton, Ill.	.....	.....	1.85	.....	.....	.....
Columbia and Krause, Ill.	1.05–1.40	.95–1.50	1.15–1.50	1.05–1.50	1.05–1.50	.....
Cypress, Ill.	1.60	1.00	1.10	1.00	1.00	1.25
Davenport, Iowa (f)	1.00	1.50	1.50	1.30	1.30	1.40
Dubuque, Iowa	.90	1.10	1.10	1.10	1.10	1.10
Stolle and Falling Springs, Ill.	1.05–1.70	.95–1.70	1.15–1.70	1.05 1.70	1.05–1.70	.....
Greencastle, Ind.	1.25	1.10	1.10	1.10	1.10	1.10
Lannon, Wis.	1.00	1.00	1.00	.90	.90	.90
McCook, Ill.	1.00	1.25	1.25	1.25	1.25	1.25
Marblehead, Ohio (l)	.55	.80	.80	.80	.80	.80
Milltown, Ind.	.....	.90–1.00	1.00–1.10	.90–1.00	.85– .90	.85– .90
Northern Ohio points	.85–1.15	1.25	1.15	1.15	1.15	1.15
Sheboygan, Wis.	1.10	1.10	1.10	1.10	1.10	1.10
Stone City, Iowa	.75	.....	1.10	1.05	1.00	.....
Thornton, Ill.	.90	1.00	1.25	1.25	1.25	1.25
Toledo, Ohio	1.10	1.70	1.70	1.70	1.70	1.70
Toronto, Canada	2.50	3.00	3.00	2.85	2.85	2.85
Valmeyer, Ill. (fluxing limestone)	.90–1.20	.....	.....	1.75	.....	1.75
Waukesha, Wis.	.....	.90	.90	.90	.90	.....
Winona, Minn.	1.00	1.20	1.30	1.40	1.40	1.40
Wisconsin points	.50	.....	1.00	.90	.90	.....
Youngstown, Ohio	1.00	1.00	1.25	1.25	1.25	1.25
SOUTHERN:						
Cartersville, Ga.	1.00	1.65	1.65	1.35	1.15	1.15
Chico, Texas	.50	.50	1.25	1.15	1.10	1.00
Cutler, Fla.	.....	.50– .75r	.....	1.50–1.75r	.....	1.10r
El Paso, Texas	.50r	1.00–1.50	1.00–1.50	1.00	1.00	.75
Graystone, Ala.	Crusher run, screened, $1 per ton					
Olive Hill, Ky.	1.00	1.00	1.00	.90	.90	.90
Rocky Point, Va.	.50– .75	1.40–1.60	1.30–1.40	1.15–1.25	1.10–1.20	1.00–1.05
WESTERN:						
Atchison, Kan.	.50	1.80	1.80	1.80	1.80	1.80
Blue Springs and Wymore, Neb.	.25	1.45	1.45	1.35c	1.25d	1.20
Cape Girardeau, Mo.	1.00	1.25	1.25	1.25	1.00	.....
Rock Hill, St. Louis, Mo.	1.45	1.45	1.45	1.45	1.45	1.45

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Birdsboro, Penn. (q)	1.20	1.60	1.45	1.35	.....	1.30
Branford, Conn.	.80	1.70	1.45	1.20	1.05	.....
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
Knippa, Tex.	2.50	2.25	1.75	1.50	1.35	1.35
New Britain, Plainville, Rocky Hill, Wallingford, Meriden, Mt. Carmel, Conn.	.80	1.70	1.45	1.20	1.05	.....
Northern New Jersey	1.35–1.40	1.80–2.10	1.80–1.90	1.50–1.60	1.50–1.60	.....
Richmond, Calif.	.75	.....	1.00	1.00	1.00	.....
Spring Valley, Calif.	.90–1.25	.90–1.25	.90–1.25	.90–1.25	.90–1.25	.90–1.25
Springfield, N. J.	1.40	2.00	1.90	1.60	1.60	.....
Toronto, Canada	.....	5.80	.....	4.05	.....	.....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley, Montello and Red Granite, Wis.—Granite	1.80	1.70	1.50	1.40	1.40	.....
Cayce, S. C.—Granite	.....	.....	1.75	1.75	1.60	.....
Eastern Pennsylvania—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40
Eastern Pennsylvania—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Emathla, Fla.—Flint rock	.....	.....	2.25–2.50s	.....	.....	.....
Lithonia, Ga.—Granite	.75	1.60	1.60	1.35	1.25	1.25
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	.....
Middlebrook, Mo.	3.00–3.50	.....	2.00–2.25	2.00–2.25	.....	1.25–3.00
Richmond, Calif.—Quartzite	.75	.....	1.00	1.00	1.00	.....
Somerset, Penn. (sand-rock)	1.50 to 1.85					
Toccoa, Ga.—Granite	1.40	1.40	.....	1.30	1.30	1.30

(a) Sand. (b) to ⅛ in. (c) 1 in., 1.40. (d) 2 in., 1.30. (e) Price net after 10c cash discount deducted. (f) High calcite fluxing limestone, 92–98% CaCO, 1.75. (g) Run of quarry. (h) Less 10c discount. (j) Less 10% net ton. (k) Rubble stone. (l) Less .05. (n) Ballast R. R., .90; run of crusher, 1.00. (p) Carload prices. (q) Crusher run, 1.40; ¼-in. granolithic finish, 3.00. (r) Cubic yard. (s) 1-in. and less, per cubic yard.

Agricultural Limestone

(Pulverized)

Alton, Ill.—Analysis, 98% $CaCO_3$, 0.01% $MgCO_3$; 100% thru 4 mesh 1.85

Bettendorf and Moline, Ill.—Analysis, $CaCO_3$, 97%; 2% $MgCO_3$; 50% thru 100 mesh, 1.50; 50% thru 4 mesh 1.50

Blackwater, Mo.—100% thru 4 mesh 1.00

Branchton, Penn.—100% thru 20 mesh, 60% thru 100 mesh, 45% thru 200 mesh a5.00

Cape Girardeau, Mo.—Analysis, $CaCO_3$, 94½%; $MgCO_3$, 3½%; 90% thru 50 mesh 1.50

Cartersville, Ga.—90% thru 100 mesh, 2.00; 50% thru 50 mesh 1.50

Chaumont, N. Y.—Pulverized limestone, bags, 4.00; bulk 2.50

Cypress, Ill.—Analysis, 94-98% $CaCO_3$, 2% $MgCO_3$; 90% thru 100 mesh, 1.35; 50% thru 100 mesh, 1.15; 90% thru 50 mesh, 1.15; 50% thru 50 mesh, 1.05; 90% thru 4 mesh, 1.10; 50% thru 4 mesh 1.00

Danbury, Conn., and West Stockbridge, Mass.—Analysis, 90% $CaCO_3$; 5% $MgCO_3$; fine ground, 90% thru 100 mesh; bulk 3.50
Paper bags 4.75
100-lb. cloth bags 5.25
(All prices less .25 cash 15 days)

Davenport, Ia.—Analysis, 97% $CaCO_3$; 2% and less $MgCO_3$; 90% thru 200 mesh, bags, per ton 6.00
90% thru 20 mesh, bulk, per ton 1.50

Hillsville, Penn.—Analysis, 94% $CaCO_3$; 1.40% $MgCO_3$; 75% thru 100 mesh; sacked 5 00

Hot Springs and Greensboro, N. C.—Analysis, $CaCO_3$, 98-99%; $MgCO_3$, 42%; pulverized; 67% thru 200 mesh; bags 3.95
Bulk 2.70

Jamesville, N. Y.—Analysis, 89% $CaCO_3$, 4% $MgCO_3$; pulverized; bags, 4.25; bulk 2.75

Joliet, Ill.—Analysis, 52% $CaCO_3$; 48% $MgCO_3$; 90% thru 100 mesh 3.50

Knoxville, Tenn.—80% thru 100 mesh; bags, 3.75; bulk 2.50

Marlbrook, Va.—Analysis, 80% $CaCO_3$; 10% $MgCO_3$; bulk 1.75
Marl — Analysis, 95% $CaCO_3$; 0% $MgCO_3$; bulk 2.25

Marion, Va.—Analysis, 90% $CaCO_3$, 2% $MgCO_3$; per ton 2.00

Middlebury, Vt.—Analysis, 99.05% $CaCO_3$; 90% thru 50 mesh 4.25

Milltown, Ind.—Analysis, 94.50% $CaCO_3$, 33% thru 50 mesh, 40% thru 50 mesh; bulk 1.35–1.60

Olive Hill, Ky.—Analysis, $CaCO_3$ 94-98%; 50% & 90% thru 4 mesh 1.00

Piqua, Ohio—Total neutralizing power 101.12%; 60% thru 100 mesh 2.50
100% thru 10, 90% thru 50, 70% thru 100; bags, 5.00; bulk 3.50
100% thru 4, 30% thru 100, bulk 1.50

Rocky Point, Va. — Analysis, $CaCO_3$, 97%; $MgCO_3$, 75%; 50% thru 200 mesh, burlap bags, 3.50; paper, 3.25; bulk 2.00

Watertown, N. Y. — Analysis, 53.72% $CaCO_3$; pulverized; sacks, 4.25; bulk 2.75

(a) Less 50c comm. per ton.

Agricultural Limestone

(Crushed)

Bedford, Ind.—Analysis, 98% $CaCO_3$; 1%, $MgCO_3$; 90% thru 10 mesh 1.50
30% thru 100 mesh 1.50

(Continued on next page)

Agricultural Limestone

Chico and Bridgeport, Tex. — Analysis, 95% $CaCO_3$; 1.3% $MgCO_3$; 90% thru 4 mesh 1.00–1.25

Charles-Town, W. Va.—Lime Marl—Analysis, 95% $CaCO_3$, 50% thru 100 mesh, bulk, 3.00; including burlap bags 4.50

Colton, Calif.—100% thru 16 mesh, bulk, 4.00; including sacks 5.00

Davenport, Ia.—Analysis, 97% $CaCO_3$; 2% and less $MgCO_3$; 90% thru 10 mesh, per ton 1.25
90% thru 4 mesh, per ton 1.10

Dubuque, Iowa—Analysis, 54% $CaCO_3$; 38% $MgCO_3$; 90% thru 50 mesh ..... .95

Dundas, Ont.—Analysis, 54% $CaCO_3$; $MgCO_3$, 43%; 50% thru 50 mesh 1.00

Ft. Spring, W. Va. — Analysis, 90% $CaCO_3$; 4% $MgCO_3$; 50% thru 100 mesh 1.50

Kansas City, Mo.—50% thru 100 mesh 1.00

Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% thru 10 mesh; 46% thru 60 mesh 2.00
Screenings (¼ in. to dust) 1.00

Marblehead, Ohio—90% thru 100 mesh 3.00
90% thru 50 mesh 2.00
90% thru 4 mesh 1.00

McCook, Ill.—90% thru 4 mesh ..... .95

Middlepoint, Bellevue, Bloomville, Kenton and Whitehouse, Ohio; Monroe, Mich.; Bluffton, Greencastle and Kokomo, Ind. —85% thru 10 mesh, 25% thru 100 mesh 1.50

Moline, Ill., and Bettendorf, Iowa—Analysis, 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh 1.50

Mountville, Va. — Analysis, 76.60% $CaCO_3$; $MgCO_3$, 22.83%, 100% thru 20 mesh; 50% thru 100 mesh, paper bags, 4.50; burlap bags 5.00

Stolle and Falling Springs, Ill.—Analysis, 89.9% $CaCO_3$, 3.8% $MgCO_3$; 90% thru 4 mesh 1.15–1.70

Stone City, Iowa — Analysis, 98% $CaCO_3$; 50% thru 50 mesh ..... .75

Waukesha, Wis.—90% thru 100 mesh, 4.00–7.00; 50% thru 100 mesh 2.10

Valmeyer, Ill.—Analysis, 96% $CaCO_3$, 2% $MgCO_3$; 100% thru 10 mesh 1.10–1.70

Pulverized Limestone for Coal Operators

Davenport, Ia.—Analysis 97% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; paper sacks 6.00

Hillsville, Penn., sacks, 5.10; bulk 3.50

Joliet, Ill.—Analysis, 52% $CaCO_3$; 48% $MgCO_3$; 95% thru 100 mesh; paper bags (bags extra) 3.50

Marblehead, Ohio — Analysis, 83.54% $CaCO_3$; 14.92% $MgCO_3$; 99.8% thru 100 mesh; sacks 4.25

Piqua, Ohio—99% thru 100 mesh, bulk, 3.50; in 80-lb. bags (f.o.b. Piqua) 5.00

Rocky Point, Va.—Analysis, 97% $CaCO_3$; 75% $MgCO_3$; 85% thru 200 mesh, bulk 2.25–3.50

Waukesha, Wis.—90% thru 100 mesh, bulk 4.00

Glass Sand

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

Cedarville and S. Vineland, N. J. *1.75–2.25
Cheshire, Mass., in carload lots 5.00–7.00
Estill Springs and Sewance, Tenn. 1.50
Franklin, Penn. 2.00
Klondike, Mo. 2.00
Massillon, Ohio 3.00
Michigan City, Ind. ..... .30– .35
Ohlton, Ohio 2.50
Ottawa, Ill. 1.25
Red Wing, Minn. 1.50
San Francisco, Calif. 4.00–5.00
Silica and Mendota, Va. 2.00
St. Louis, Mo. 2.00
Utica and Ottawa, Ill. 75–1.00
Zanesville, Ohio 2.50

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Beach City, Ohio		1.50
Dresden, Ohio		1.25
Eau Claire, Wis.	4.30	
Estill Springs and Sewanee, Tenn.	1.35–1.50	1.35–1.50
Franklin, Penn.		1.75
Massillon, Ohio		2.00
Michigan City, Ind.		.30
Montoursville, Penn.		1.25
Ohlton, Ohio	1.75	1.75
Ottawa, Ill.	1.25	1.25
Red Wing, Minn.		1.00
San Francisco, Calif.	3.50	3.50
Silica, Va.		1.75

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Asbury Park, Farmingdale, Spring Lake and Wayside, N. J.	.50	.50	1.15	1.25	1.25	
Attica and Franklinville, N. Y.	.65	.65	.75	.65	.65	.65
Boston, Mass.†	1.40	1.40	2.25		2.25	2.25
Buffalo, N. Y.	1.00	1.05	1.05			
Erie, Penn.	.70	.90		1.30		
Leeds Junction, Me.		.50	1.75		1.25	1.00
Machias Jct., N. Y.	.75	.75	.75		.75	.75
Milton, N. H.		.50				.90
Montoursville, Penn.	1.00	.75	.80	.75	.70	.70
Northern New Jersey	.40– .50	.40– .50	1.00–1.25	1.00–1.25	1.00–1.25	
Somerset, Penn.		2.00				
South Portland, Me.		1.00	2.25			2.00
Troy, N. Y.	.50– .75*	.50– .75*	.80–1.00*	.80–1.00*		.80–1.00*
F. o. b. boat, per yd.	1.50	1.50	1.75	1.75		1.75
Washington, D. C.	.55	.55	1.20	1.20	1.00	1.00
CENTRAL:						
Algonquin, Ill.	.50	.35	.25	.45	.45	.50
Appleton, Minn.		.50	1.25		1.50	
Attica, Ind.			All sizes .75–.85			
Aurora, Moronts, Oregon, Sheridan, Yorkville, Ill.	.50	.35	.20	.50	.60	.60
Barton, Wis.		.40s	.50s	.65s	.65s	.65s
Chicago, Ill.	.50	.50–1.45n	.60	.60–1.55n	.60	.60–1.90n
Chicago, Ill.	.30	.20	.30	.40	.40	.45
Columbus, Ohio		.75‖	.75‖	.75‖	.75‖	
Des Moines, Iowa		.60	1.50	1.50	1.50	1.50
Eau Claire, Chippewa Falls, Wis.	.40	.40	.55– .75	.85	.85	
Elkhart Lake, Wis.	.40	.30	.45	.50	.50	.50
Ferrysburg, Mich.		.50– .80	.60–1.00	.60–1.00		.50–1.25
Grand Haven, Mich.		.60		.90		.90
Grand Rapids, Mich.	.50	.50	.90	.80	.70	.70
Hamilton, Ohio		.85	.85		.85	
Hersey, Mich.		.50	.50	.70	.70	.70
Humboldt, Iowa	.50	.50	1.40	1.40	1.40	1.40
Indianapolis, Ind.	.50– .75	.40– .60	.50– .75	.50– .75	.60– .85	.60– .85
Mankato, Minn.	.55	.45	1.25		1.25h	
Mason City, Iowa		.60	.85	1.25	1.25	1.25
Mattoon, Ill.			.75–.85 all sizes			
Milwaukee, Wis.	.91	.91	1.06	1.06	1.06	1.06
Minneapolis, Minn. (g)	.35	.35	1.25	1.35	1.35	1.25
St. Louis, Mo. (b)	1.30e	1.30f	1.55t	1.55	1.55	1.65
St. Louis, Mo.†	2.00e	2.00f	2.25t	2.25	2.25	2.35
St. Paul, Minn.	.35	.35	1.25	1.25	1.25	1.25
Terre Haute, Ind.	.75	.60	.75	.75	.75	.75
Waukesha, Wis.		.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	.50	1.10	1.10	1.25
SOUTHERN:						
Brewster, Fla.	.50	.50				
Brookhaven, Miss.	1.25	.70	1.25	1.00	.70	.70
Charleston, W. Va.			River sand and gravel, all sizes, 1.40			
Eustis, Fla.		.50				
Fort Worth, Texas	.75–1.00	.75–1.00	1.00–1.10	1.00–1.25	1.00–1.25	
Knoxville, Tenn.	.90	1.00	1.20	1.20	1.20	1.20
Macon, Ga.	.65– .90	.65– .90	2.25–2.50	2.25–2.50	2.25–2.50	2.25–2.50
New Martinsville, W. Va.	1.10	1.00		1.30	1.10	.90
Roseland, La.	.30	.30	1.00	1.00	.80	.80
WESTERN:						
Kansas City, Mo.	.70– .80	.70– .75				
Crushton, Durbin, Kincaid, Largo, Rivas, Calif.	.10– .40	.10– .40	.50–1.00	.50–1.00	.50–1.00	.50–1.00
Los Angeles, Calif.	.30	.30	.80	.80	.80	.80
Oregon City, Ore.			All grades range from 1.00 to 1.25 per cu. yd.			
Otay, Calif.		.35– .40	.50– .60	.50– .60	.50– .60	.50– .60
Phoenix, Ariz. (k)	1.25*	1.15*	1.50*	1.15*	1.15*	1.00*
Pueblo, Colo.	.70	.60		1.25		1.15
Seattle, Wash.	1.25*	1.25*	1.25*	1.25*	1.25*	1.25*
Steilacoom, Wash.	.50	.50	.50	.50	.50	.50

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Algonquin and Beloit, Wis.			.40			
Appleton, Minn.	.55					
Brookhaven, Miss.						.60
Buffalo, N. Y.	1.10	.95		.85		.95
Burnside, Conn.		.75*				
Chicago, Ill.	1.25m			.35		
Des Moines, Iowa		.75				
Dresden, Ohio				.70	.65	
Eau Claire, Chippewa Falls, Wis.					.65	
Fort Worth, Texas						.60
Gainesville, Tex.					.55	
Grand Rapids, Mich.				.50		
Hamilton, Ohio					.70	
Hersey, Mich.				.50		
Indianapolis, Ind.			Mixed gravel for concrete work, at .65			
Macon, Ga.	.35					
Mankato, Minn.	.70					
Oregon City, Ore.	1.25*	1.25*	1.25*	1.25*	1.25*	1.25*
Roseland, La.				.60	.60	.60
Somerset, Penn.		1.85–2.00		1.50–1.75		
Steilacoom, Wash.	.25					
St. Louis, Mo.			Mine run gravel, 1.55 per ton			
Summit Grove, Ind.	.50	.50	.50	.50	.50	.54
Winona, Minn.						.60
York, Penn.	1.10	1.00				

*Cubic yd. †Delivered on job by truck. (a) ⅝-in. down. (b) 1½- to ¼-in., 1.65. (c) 2½-in. and less. ‖By truck only. (d) Delivered in Hartford, Conn., $1.50 per yd. (e) Mississippi River. (f) Meramee River. (g) Per yd., del. by truck, ¼-in. down, 1.25; 2 in. and less, 2.40. (h) ¾-in. and larger. (j) Lake sand, 1.75, delivered. (k) 60–70% crushed boulders. (m) Cu. yd., dune sand, f.o.b. cars, Chicago. (n) Cu. yd., f.o.b. cars, Chicago. (r) Pit run. (s) Plus 15c for winter loading. (t) Fine and regular binder. (u) Coarse, torpedo, also roofing. (v) Coarse binder. †2% discount if paid by 15th of month following delivery.

Core and Foundry Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

City or shipping point	Molding, fine	Molding, coarse	Molding, brass	Core	Furnace lining	Sand blast	Stone sawing
Albany, N. Y.	2.25	2.00	2.25			4.00	
Beach City, Ohio	1.75	1.75		1.50	1.50		
Cheshire, Mass.	Sand for soap, 7.00–8.00					6.00–8.00	
Dresden, Ohio	1.25–1.50	1.25–1.50	1.50–1.75	1.00 1.25			
Eau Claire, Wis.						2.50–3.00	
Elco and Murphysboro, Ill.	Water-floated ground silica per ton in carloads—18.00–31.00						
Estill Springs and Sewanee, Tenn.	1.25			1.25		1.35–1.50	
Franklin, Penn.	1.75	1.75		1.75			
Kasota, Minn.							1.00
Kerrs, Ohio	1.10–1.50	1.25–2.00	2.00			2.75–3.00	
Klondike, Mo.	2.00			2.00			
Massillon, Ohio	2.25	2.25		2.25	2.50		
Michigan City, Ind.				.30– .35			
Montoursville, Penn.				1.50–1.60			
New Lexington, Ohio	2.00	1.50					
Ohlton, Ohio	1.75	1.75		2.00	1.75	1.75	
Ottawa, Ill.	1.25–3.25	2.25	1.25–3.25	1.25–3.25	1.25	3.50	3.00
Red Wing, Minn. (d)					1.50	3.00	1.50
San Francisco, Calif.[1]	3.50†	5.00†	3.50†	3.50–5.00†	3.50–5.00†	3.50–5.00†	
Silica, Mendota, Va.		Potters sand, 8.00–10.00g					1.75
Utica and Ottawa, Ill.	.40–1.00f	.40–1.00f	.75–1.00	.40–1.00f	.60–1.00f	2.23–3.25	1.00–3.25
Utica, Ill.	.60	.70		.75	1.00		
Warwick, Ohio	1.50*–2.00h	1.50*–2.00h		1.50*–2.00h			
Zanesville, Ohio	2.00	1.50	2.00	2.50	2.00		

*Green. †Fresh water washed, steam dried. [1]Core, washed and dried, 2.50. (d) Filter sand, 3.00. (e) Filter sand, 3.00–4.25. (f) Crude and dry. (g) Also 12.00; building sand, 1.75–2.00. (h) Washed, 1.75.

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y., Erie and Du Bois, Penn.	2.25	1.25	1.25	1.35	1.25	1.25	1.25
Eastern Penn.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Northern New Jersey	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Penn.	2.50	1.25		1.50			
Western Pennsylvania	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio		1.30*		1.45*	1.45*	1.45*	
Jackson, Ohio	2.05*	1.05*	1.80*	1.30*	1.05*	1.30*	1.30*
Toledo, Ohio	1.50	1.10	1.25	1.25	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.	2.05*	1.45*	1.80*	1.45*	1.45*	1.45*	1.45*
Ensley and Alabama City, Ala.	2.05	.55	1.25	1.15	.90	.90	.80
Longdale, Roanoke, Ruesens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.05
Woodward, Ala.†	2.05	.55*		1.15*	.90*	.90*	

5c per ton discount on terms. †1¼ in. to ¼ in., $1.05; ⅝ in. to 10 mesh, $1.25*; ¾ in. to 0 in., .90*; ¼ in. to 10 mesh, .80*.

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.			12.00					2.00
Buffalo, N. Y.	11.50	7.50	7.50	12.00	8.00	11.00	7.50	1.50[16]
Lime Ridge, Penn.							5.00	
West Stockbridge, Mass.	12.00	10.00	5.60					2.00[13]
Williamsport, Penn.	10.00–11.00	8.50–9.00	8.50–9.00		7.00	9.00	5.00	
York, Penn., & Oranda, Va.	11.50[7]	8.50–9.50[7]	8.50–9.50[7]	8.50–10.50[7]	8.00	9.25	7.00	1.40[3]
CENTRAL:								
Afton, Mich.						10.75	7.50	12.11
Carey, Ohio	11.50	7.50	7.50		8.00		7.50	1.50
Cold Springs, Ohio		7.50	7.50					
Gibsonburg, Ohio	11.50				8.00	10.00		
Huntington, Ind.	11.50	7.50	7.50	12.00	8.00	11.00	7.50	1.50[16]
Luckey, Ohio	11.50							
Milltown, Ind.		8.50–10.00		10.00[8]			8.50[22]	1.35[16]
Ohio points	11.50	7.50	7.50	12.00	8.00	11.00[23]	7.50	1.50[16]
Scioto, Ohio	10.50	7.50	7.50	8.50	8.00	.62½	7.00	1.50
Sheboygan, Wis.		10.50					9.50	2.00[4]
Wisconsin points[6]		11.50					9.50	
Woodville, Ohio	11.50	7.50	7.50	12.50	8.00	10.00[9]	8.00	1.50[3]
SOUTHERN:								
El Paso, Texas							7.00	1.50
Frederick, Md.		8.00–9.50	8.00–9.50			9.50[15]	7.00[15]	
Graystone & Landmark, Ala.	12.50	9.00		12.50	8.50		7.50	1.35
Keystone, Ala.		9.00	8.00	9.00	9.00	11.00	7.50	1.35
Knoxville, Tenn.	19.00	9.00	9.00	9.00	6.00	.67½	6.00	1.35
Ocala and Kendrick, Fla.		11.00		12.00				
WESTERN:								
Kirtland, N. M.							10.00	
Los Angeles, Calif.	15.00	14.00	12.00	18.00			13.50	
San Francisco, Calif.	19.00–19.50	15.00–17.50	13.00	17.00–19.00	14.50[20]	.90[17]	14.50[19]	1.85[17]
Tehachapi, Calif.[13]	10.80		6.75[11]	12.00			10.30	
Seattle, Wash.	19.00	19.00	12.00	19.00	19.00		18.60	2.30

[1] Barrels. [2] Net ton. [3] Wooden, steel 1.70. [4] Steel; in bbl. .95. [5] Dealers' prices, net 30 days less 25c discount per ton on hydrated lime and 5c per bbl. on lump if paid in 10 days. [7] In paper bags, including bags. [8] To 11.00. [9] 80-lb. [10] In bags. [11] Refuse or air slack, 10.00–12.00. [12] To 3.00. [13] Delivered in Southern California. [15] To 8.00. [16] To 1.70. [17] Less credit for return of empties. [18] 90-lb. sacks. [19] To mortar plant and large industrials, 13.00. [20] Also 13.00. [22] To 9.00 [23] Per bbl., 2.15. [30] To 16.50.

Miscellaneous Sands

(Continued)

City or shipping point	Roofing sand	Traction
Utica and Ottawa, Ill.	1.00–3.25	.75
Warwick, Ohio		2.00
Zanesville, Ohio		2.50

*Damp.

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Chatsworth, Ga.:	
Crude talc, per ton	5.00–10.00
Ground talc (20-50 mesh), bags	7.00– 9.00
Ground talc (150-200 mesh), bags	10.00–12.00
Pencils and steel crayons, gross	1.50– 3.00
Chester, Vt.:	
Ground talc (150-200 mesh), paper bags (bags extra)	8.00– 8.50
Same, including 50-lb. bags	9.00– 9.50
Chicago and Joliet, Ill.:	
Ground (150-200 mesh), bags	30.00
Clifton, Va.:	
Crude talc, per ton	4.00
Ground talc (150-200 mesh), in bags	12.00
Conowingo, Md.:	
Crude talc, bulk	4.00
Ground talc (150-200 mesh), in bags	14.00
Cubes, blanks, per lb.	.10
Dalton, Ga.:	
Crude talc (for grinding)	4.00
Ground talc (150-200 mesh), bags	9.00
Pencils and steel worker's crayons, per gross	1.00– 2.00
Emeryville, N. Y.:	
Crude talc, 325 mesh	14.75–16.00
Hailesboro, N. Y.:	
Ground talc (300-350 mesh) in 200-lb. bags	15.50–20.00
Henry, Va.:	
Crude (mine run)	3.50– 4.00
Ground talc (150-200 mesh), bags	6.25–10.50
Joliet, Ill.:	
Ground talc (200 mesh) in bags:	
California white	30.00
Southern white	20.00
Illinois talc	10.00
Crude talc	3.75
Keeler, Calif.:	
Ground (200-300 mesh), bags	20.00–30.00
Los Angeles, Calif.:	
Ground (200 mesh), in bags	14.00 25.00
Natural Bridge, N. Y.:	
Ground talc (300-325 mesh), bags	12.00–15.00

(a) Bags extra.

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock	
Columbia, Tenn.—B.P.L. 65-70%	3.50– 4.50
Gordonsburg, Tenn.—B.P.L. 68-70%	4.00– 4.50
Mt. Pleasant, Tenn.—B.P.L., 77%	6.50
Tennessee — F.o.b. mines, gross ton, unground brown rock, B.P.L. 72%	5.00
B.P.L. 75%	6.00
Twomey, Tenn.—B.P.L. 65%, 2000 lb.	8.00– 9.00
Ground Rock (2000 lb.)	
Centerville, Tenn.—B.P.L. 65%	8.00
Gordonsburg, Tenn.—B.P.L. 65–70%	3.75– 4.50
Mt. Pleasant, Tenn.—Lime phosphate:	
B.P.L., 72.50%, 80% thru 300 mesh	11.70
B.P.L. 72%	5.50– 6.00
Twomey, Tenn.—B.P.L. 65%	8.00
Wales, Tenn.—B.P.L. 65%	11.00

Florida Phosphate

(Raw Land Pebble)
(Per Ton)

Florida—F.o.b. mines, gross ton, 68/66%	
B.P.L., Basis 68%	3.25
70% min. B.P.L., Basis 70%	3.75

Mica

Prices given are net, f.o.b. plant or nearest shipping point.

Bedford, N. Y.—Mine scrap	12.50–14.70
New York City, N. Y.—Per lb.,	
Cut mica (1½x2)	1.60
Cut mica (8x10)	26.00
Pringle, S. D.—Mine run, per ton	125.00
Punch mica, per lb.	.06
Scrap, per ton, carloads	20.00
Rumney Depot, N. H.—Per ton,	
Mine run	300.00
Clean shop scrap	27.00
Mine scrap	20.00
Roofing mica	38.00
Punch mica, per lb.	.05– .12
Trimmed mica; 50% disc. from list, per ton, 20 mesh, 32.50; 40 mesh, 38.00; 60 mesh, 40.00; 100 mesh, 60.00; 200 mesh	70.00

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Brandon, Vt.—English pink, cream, and American Botticino, coral pink, pearl blush	‖12.50–‖14.50	¶12.50–‖14.50
Brighton, Tenn.—Pink marble chips	$3.00	$3.00
Crown Point, N. Y.—Mica Spar		¶9.00–‖12.00
Davenport, Ia.—White limestone, in bags	6.00	6.00
Easton, Penn.—Royal green	16.00–18.00a	
Harrisonburg, Va. — Bulk marble (crushed, in bags)	12.50–14.00	12.50–14.00
Ingomar, Ohio — Concrete facings and stucco dash		11.00–18.00
Middlebrook, Mo.—Red		20.00–25.00
Middlebury, Vt. — Middlebury white		‖9.00–¶10.00
Middlebury and Brandon, Vt.—Caststone, per ton, including bags		5.50
Phillipsburg, N. J.—Royal green granite		18.00–20.00
Randville, Mich.—Crystalite white marble, bulk	4.00	4.00– 7.00
Stockton, Calif.—"Nat-rock" roofing grits		12.00–20.00
Tuckahoe, N. Y.—Tuckahoe white	8.00	
Warren, N. H.		¶8.50
Wellsville, Colo.—Colorado Travertine Stone	15.00	15.00
Whitestone, Ga.	b5.00	

†C.L.; L.C.L. 16.00. ¶C.L. ‖L.C.L. (a) Including bags. (b) In burlap bags, 2.00 per ton extra. *Per 100 lb.

Potash Feldspar

Auburn and Topsham, Me.—Color white, 98% thru 140-mesh — **19.00**

DeKalb Jct., N. Y.—Color, white; analysis, K_2O, 2.11%; Na_2O, 6.86%; SiO_2, 74.04%; Fe_2O_3, .063%; Al_2O_3, 14.59%; pulverized, 100% thru 200 mesh, soda spar, in bags, per ton, 22.00, bulk 20.00; 100% thru 140 mesh, in bags, per ton, 20.00; bulk — 18.00

Bedford Hills, N. Y.—Color, white; analysis, K_2O, 12.26%; Na_2O, 2.86%; SiO_2, 66.05%; Fe_2O_3, .08%; Al_2O_3, 18.89%; pulverized 78% thru 100 mesh, bulk, 11.00–14.00; crude, bulk, per ton — 9.00

Trenton, N. J.—White; analysis, K_2O, 11%-13%; Na_2O, 1.5%-2.70%; SiO_2, 63%-67.80%; Fe_2O_3, .09%; Al_2O_3, 18.25%-20%; pulverized, 99.5% thru 200 mesh — 20.00

Rochester, N. Y. — 22.00

Los Angeles, Calif.—Color, white; analysis, K_2O, 12.16%; Na_2O, 1.53%; SiO_2, 65.60%; Fe_2O_3, .10%; Al_2O_3, 19.20%; Arizona spar, crude, bags, 12.50–14.00; bulk — 11.00–12.50

Pulverized, 95% thru 200 mesh; bags, 19.73–23.50; bulk — 15.75–22.50

Pulverized, 20% thru 80 mesh; bags, 17.60; bulk — 16.50

Rumney and Cardigan, N. H.—Color, white; analysis, K_2O, 9-12%; Na_2O, trace; SiO_2, 64-67%; Al_2O_3, 17-18%, crude, bulk — 7.00– 7.50

Rumney Depot, N. H.—Color, white; analysis, K_2O, 8-13%; Na_2O, 1-1½%; SiO_2, 62-68%; Al_2O_3, 17-18%, crude, bulk — 7.00– 7.50

Penland, N. C.—White; crude, bulk — 8.00

Ground, bulk — 16.50

Spruce Pine, N. C.—Color, white; analysis, K_2O, 10%; Na_2O, 3%; SiO_2, 68%; Fe_2O_3, 0.10%; Al_2O_3, 18%; 99½% thru 200 mesh; pulverized, bulk — 18.00

(Bags 15c extra.)

Tennessee Mills—Color, white; analysis, K_2O, 10%; Na_2O_3, 3%; SiO_2, 68%; 99½% thru 200 mesh; bulk (Bags, 15c extra) — **18.00**

Chicken Grits

Afton, Mich.—(Limestone), per ton	1.75
Belfast, Me.—(Limestone), per ton	‡10.00
Chico, Tex.—Hen size and Baby Chick, packed in 100-lb. sacks, per sack	1.00
Danbury, Conn.; Adams, Ashley Falls, and West Stockbridge, Mass.—(Limestone)	‡7.50–*9.00
Davenport, Ia.—(Limestone), bags, per ton	6.00
Easton, Penn.—In bags	8.00
El Paso, Tex.—Per ton	1.00
Knoxville, Tenn.—Per bag	1.25
Los Angeles, Calif.—Per ton, including sacks:	
Feldspar	14.00
Gypsum	7.50– 9.50
Marion, Va.—(Limestone), bulk, 5.00; bagged, 6.50; 100-lb. bag	.50
Middlebury, Vt.—Per ton (a)	10.00
Piqua, O. (b)—(Pearl Grit), fine and medium, per ton	¶8.00
Randville, Mich.—(Marble), bulk	6.00
Rocky Point, Va.—(Limestone), 100-lb. bags, 50c; sacks, per ton, 6.00; bulk	5.00
Seattle, Wash.—(Gypsum), bulk, per ton	10.00
Tuckahoe, N. Y.	8.00
Waukesha, Wis.—(Limestone), per ton	7.00
Wisconsin Points—(Limestone), per ton	15.00
Winona, Minn.—(Limestone), sacked, per ton, 8.00; bulk, per ton	6.00

*L.C.L. †Less than 5-ton lots. ‡C.L. ¶100-lb. bags.

(a) F.o.b. Middlebury, Vt. (b) F.o.b. Piqua, Ohio.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Albany, Ga.	11.00
Barton, Wis.	10.50g
Boston, Mass.	17.00*
Brighton, N. Y.	19.75*
Dayton, Ohio	12.50–13.50
Detroit, Mich. (h)	j13.00–16.00*d
Farmington, Conn.	13.00
Flint, Mich.	18.00†
Grand Rapids, Mich.	12.50
Hartford, Conn.	13.00–17.00*
Jackson, Mich.	13.00
Lakeland, Fla.	10.00–11.00
Lake Helen, Fla.	9.00–12.00
Lancaster, N. Y.	12.25
Madison, Wis.	12.50a
Mishawaka, Ind.	11.00
Milwaukee, Wis.	13.00*
Minneapolis, Minn.	10.00
New Brighton, Minn.	10.00
Pontiac, Mich.	12.50
Portage, Wis.	15.00
Prairie du Chien, Wis.	18.00–22.50
Rochester, N. Y.	19.75
Saginaw, Mich.	13.50
San Antonio, Texas	12.50
Sebewaing, Mich.	12.50
Sioux Falls, S. Dak.	13.00
South River, N. J.	13.00
South St. Paul, Minn.	9.00
Syracuse, N. Y.	18.00–20.00
Toronto, Canada (f)	15.00fe
Wilkinson, Fla.	12.00–16.00
Winnipeg, Canada	15.00

Delivered on job. †5% disc. 10 days. ‖Dealers' price. (a) Less 50c disc. per M, 10th of month. (d) 5% disc., 10th of month. (e) Delivered. (f) In yard, 12.00–12.50; also 12.25. (g) Delivered Milwaukee, 13.00. (h) Also 15.50 (j) Also 14.00.

Portland Cement

	Per Bag	Per Bbl.	High Early Strength
Albuquerque, N. M.	.86¼	3.45	.....
Atlanta, Ga.	.....	2.26	3.16¶
Baltimore, Md.	.....	2.25–2.65	3.55¶
Birmingham, Ala.	.....	1.90	2.80¶
Boston, Mass. (g)	.57e	1.88–2.28	3.27¶
Buffalo, N. Y.	.62½	2.10†	3.40¶
Butte, Mont.	.90¼	3.61	.....
Cedar Rapids, Iowa	.....	2.24	.....
Charleston, S. C.	.....	2.25–2.55d	3.15¶
Cheyenne, Wyo.	.66½	2.66	.....
Chicago, Ill.	.....	2.05–2.45	3.35¶
Cincinnati, Ohio	.....	2.17–2.57	3.47¶
Cleveland, Ohio	.....	2.14–2.64	3.54¶
Columbus, Ohio	.....	2.22–2.62	3.52¶
Dallas, Texas	.....	1.80	3.39¶
Davenport, Iowa	.....	2.24	.....
Dayton, Ohio	.....	2.21–2.61	3.51¶
Denver, Colo.	.66¼	2.65	.....
Des Moines, Iowa	.....	2.14	.....
Detroit, Mich.	.....	1.95–2.35	3.25¶
Duluth, Minn.	.....	2.04	.....
Houston, Texas	.....	1.90	3.63¶
Indianapolis, Ind.	.54¾	2.09–2.49	3.39¶
Jackson, Miss.	.....	1.94–2.34	3.24¶
Jacksonville, Fla.	.....	2.51b	3.26¶
Jersey City, N. J.	.....	2.13–2.53	3.43¶
Kansas City, Mo.	.45½	1.82	3.22¶
Los Angeles, Calif.	.51½	2.06	.....
Louisville, Ky.	.55½	2.47	3.37¶
Memphis, Tenn.	.....	1.94–2.34	3.24¶
Milwaukee, Wis.	.....	2.20–2.60	3.50¶
Minneapolis, Minn.	.....	2.12–2.22	.....
Montreal, Que.	.....	1.60	.....
New Orleans, La.	.45½	1.82	3.22¶
New York, N. Y.	.60¾	1.93–2.43	3.33¶
Norfolk, Va.	.....	1.97	3.27¶
Oklahoma City, Okla.	.57¼	2.29	3.69¶
Omaha, Neb.	.54	2.16	3.56¶
Peoria, Ill.	.....	2.22	.....
Pittsburgh, Penn.	.....	2.05–2.44	3.35¶
Philadelphia, Penn.	.....	2.15	3.45¶
Phoenix, Ariz.	.....	3.91*	.....
Portland, Ore.‡	.....	2.40–2.90a	.....
Reno, Nev.‡	.....	2.91–3.41a	.....
Richmond, Va.	.....	2.32–2.72	3.62¶
Salt Lake City, Utah	.70¼	2.81	.....
San Francisco, Calif.‡	.....	2.21–2.71a	.....
Savannah, Ga.	.....	2.51c	3.15¶
St. Louis, Mo.	.48¾	1.95–2.35	f3.25¶
St. Paul, Minn.	.....	2.12–2.22	.....
Seattle, Wash.	.....	†2.50–2.65j	f3.50†
Tampa, Fla.	.....	2.40	3.30¶
Toledo, Ohio	.....	2.20–2.60	3.50¶
Topeka, Kan.	.50¼	2.01	3.41¶
Tulsa, Okla.	.53¼	2.13	3.53¶
Wheeling, W. Va.	.....	2.12–2.52	3.42¶
Winston-Salem, N. C.	.....	2.19–2.59	3.49¶
Mill prices f.o.b. in carload lots, without bags, to contractors.			
Albany, N. Y.	.43¾	**1.75**	.....
Bellingham, Wash.	.....	**2.10**	.....
Buffington, Ind.	.....	**1.80**	.....
Chattanooga, Tenn.	.....	**2.45***	.....
Concrete, Wash.	.....	**2.35**	.....
Davenport, Calif.	.....	**2.05**	.....
Hannibal, Mo.	.....	**1.90**	.....
Hudson, N. Y.	.....	**1.75**	.....
Leeds, Ala.	.....	**1.65**	.....
Lime and Oswego, Ore.	.....	**2.50‡**	.....
Mildred, Kan.	.....	**2.35**	.....
Nazareth, Penn.	.....	**2.15**	.....
Northampton, Penn.	.....	**1.75**	.....
Richard City, Tenn.	.....	**2.05**	.....
Steelton, Minn.	.....	1.85	.....
Toledo, Ohio	.....	**2.20**	.....
Universal, Penn.	.....	**1.80**	.....

NOTE—Add 40c per bbl. for bags. *Includes sacks. †10c disc., 10 days. ‡10c disc., 15 days. (a) Includes cloth sacks returnable at 10c each. (b) 15c bbl. refund for paid freight bill. (c) 26c bbl. refund for paid freight bill. (d) 30c bbl. refund for paid freight bill. (e) Paid freight bill taken as part payment of invoice. (f) "Velo" cement, including cost of paper bag. ¶ "Incor" Perfected, prices per bbl. packed in paper sacks, subject to 10c disc. 15 days. (g) Also 2.33 per bbl. (j) 25c bbl. disc. 10 days.

Gypsum Products— CARLOAD PRICES PER TON AND PER M SQUARE FEET, F.O.B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gaging Plaster	Wood Fiber	Gaging White	Plaster Sanded	Cement Keene's	Finish Trowel	—Plaster Board— ½x32x 36". Per M Sq. Ft.	⅜x32x 36". Per M Sq. Ft.	Wallboard, ⅜x32 or 48" Lengths 6'-10'. Per M Sq. Ft.
Acme, Tex.	1.50–3.00	4.00	4.00	4.00–6.00	4.00–6.00	4.00–6.00	10.00	10.00	19.00	19.00	10.50	10.50	12.00
Blue Rapids, Kan.	1.50–3.00	4.00	4.00	4.00–6.00	4.00–6.00	4.00–6.00	10.00	10.00	19.00	19.00	10.50	10.50	12.00
Delawanna, N. J.	.....	.....	.....	**4.50–5.00**	**13.10–14.00**	**5.00**	.....	**7.25**	.....	.....	.....	.....	**25.00**
East St. Louis, Ill.	Special Gypsum Products—Interior partition section, 4 in. wide, 12 in. thick and up to 10 ft. 6 in. long, per ton, 21.00; 6x6 in. and up to 10 ft. 6 in. long, per ton, 30.00; floor section, 7x16 in. and up to 13 ft. 6 in. long, per ton, 23.00.												
Ft. Dodge, Iowa; N. Holston, Va.; Akron, N. Y.	1.50–3.00	4.00	4.00	4.00–6.00	4.00–6.00	4.00–6.00	10.00	10.00	19.00	19.00	10.50	10.50	12.00
Grand Rapids, Mich.	1.50–3.00	4.00	4.00	4.00–6.00	4.00–6.00	4.00–6.00	10.00	10.00	19.00	19.00	10.50	10.50	12.00
Gypsum, Ohio	1.70–3.00	4.00	6.00	7.00–9.00	9.00	9.00	**19.00**	**7.00**	**24.50**	**19.00**	.....	15.00	**20.00–25.00**
Los Angeles, Calif. (f)	3.50–5.00	6.00–8.00	6.00–8.00	7.50–8.50	7.50–10.00	.....	8.00–10.00	.....	26.90	.....	.....	.....	.....
Medicine Lodge, Kan.	.....	.....	.....	.....	.....	.....	.....	.....	15.00	.....	.....	.....	.....
Oakfield, N. Y.	**2.50**	.....	.....	**5.50**	**6.00**	**6.00**	.....	**5.50**	.....	.....	.....	15.00	**25.00**
Port Clinton, Ohio	**3.00**	**4.00**	**6.00**	**10.00**	**9.00**	**9.00**	**21.00**	**7.00**	**30.15**	**20.00**	.....	20.00	**30.00**
Providence, R. I. (x)	.....	.....	.....	12.00–13.00o	.....	.....	.....	.....	.....	.....	Partition block, solid reinforced, 12x30x3", 7c per sq. ft. in truck lots		
San Francisco, Calif.	.....	.....	**9.00**	**13.40**	**14.40**	.....	**15.40**	.....	.....	.....	.....	.....	.....
Seattle, Wash.	.....	.....	10.50m	12.00m	13.00	.....	14.00	.....	.....	.....	.....	.....	.....
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00	.....	.....	.....	.....	20.00w	.....	33.00

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable. (a) Hardwall plaster, 13.00; casting, finishing molding, 14.00; (b) Calacoustic plaster, 10.00 at mill; (c) Plaster lath; (d) ¼x48x36 in.; (f) plasterboard, 18c to 20c per yd.; (m) includes paper bags; (o) includes jute sacks; (u) includes sacks; (v) retail, 35.00; (w) 16x48; (x) 2- and 3-in. "Fabricaste" gypsum blocks, 6–7c per sq. ft.

Market Prices of Cement Products and Slate

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point.

City or shipping point	Size 8x8x16
Camden, N. J.	16.50
Cement City, Mich.	55.00¶
Chicago District‖	180.00–210.00a
8x10x16	230.00–260.00a
8x12x16	280.00–330.00a
Columbus, Ohio	15.00c– 17.00†
Detroit, Mich. (d)	.15– .17†
Forest Park, Ill.	21.00*
Grand Rapids, Mich.	11.00*
Graettinger, Iowa	.18– .20
Indianapolis, Ind.	.10– .12a
Los Angeles, Calif.	4x8x12–5.00*
Olivia and Mankato, Minn.	9.50b
Somerset, Penn.	.18– .20
Tiskilwa, Ill.	.16– .18†
Yakima, Wash.	20.00*

*Price per 100 at plant. †Rock or panel face. ‡Delivered. ¶5x8x12, 55.00 per 1000. (a) Face. (b) Per ton. (c) Plain. (d) 8x12x16, rock or panel face, .24–.26.

Cement Building Tile

Camden and Trenton, N. J.:	
3x8x16, per 100, 9.00; 3x9x16, per 100	9.00
4x8x16, per 100, 12.00; 4x9x16, per 100	13.00
6x8x16, per 100, 16.50; 6x9x16, per 100	15.50
Cement City, Mich.:	
5x8x12, per 100	5.00
Chicago District (Haydite):	
4x 8x16, per 100	13.00
8x 8x16, per 100	20.00
8x12x16, per 100	28.00
Columbus, Ohio:	
5x8x12, per 100	6.00
Detroit, Mich.:	
5½x8x12, per M	75.00
Grand Rapids, Mich.:	
5x8x12, per 100	6.00
Longview, Wash.:	
4x6x12, per 100	5.00
4x8x12, per 100	6.25
Mt. Pleasant, N. Y.:	
5x8x12, per M	78.00
Houston, Texas:	
5x8x12 (Lightweight), per M	80.00

Cement Roofing Tile

Prices are net per square, carload lots, f.o.b. nearest shipping point, unless otherwise stated.

Camden and Trenton, N. J.—8x12, per sq.:	
Red	15.00
Green	18.00
Cicero, Ill.—French and Spanish tile (red, orange, choc., yellow, tan, slate, gray) per sq., 9.50–10.00; green or blue, per sq.	11.50–12.00
Detroit, Mich.—5x8x12, per M	67.50
Houston, Texas—Roofing Tile, per sq.	25.0c
Indianapolis, Ind.—9x15-in.	Per sq.
Gray	10.00
Red	11.00
Green	13.00
Wildasin Spur, Los Angeles, Calif. (Stone-Tile):	
3½x6x12, per M	50.00
3½x8x12, per M	60.00
Prairie du Chien, Wis.:	
5x8x12, per M	82.00
5x4x12, per M	46.00
5x8x6 (half-tile), per M	41.00
5x8x10 (fractional), per M	82.00
Yakima, Wash. (Building Tile):	Each
5x8x12	.10

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	25.00– 40.00
Baltimore, Md. (Del. according to quantity)	15.50	22.00– 50.00
Camden & Trenton, N. J.	17.00	
Chicago District "Haydite"	14.00	
Columbus, Ohio	16.00	17.00
El Paso, Tex.—Klinker	10.00	
Ensley, Ala. ("Slagtex")	12.50	
Eugene, Ore.	25.00	35.00– 75.00
Forest Park, Ill.		37.00
Friesland, Wis.	22.00	32.00
Longview, Wash.*	15.00	22.50– 65.00
Los Angeles, Calif.	12.50	
Milwaukee, Wis.	14.00	32.00
Mt. Pleasant, N. Y.		14.00– 23.00
Omaha, Neb.	18.00	30.00– 40.00
Pasadena, Calif.	10.00	
Philadelphia, Penn.	15.50	
Portland, Ore.	17.50	23.00– 55.00
Mantel brick—100.00–150.00		
Prairie du Chien, Wis.	14.00	22.00– 25.00
Rapid City, S. D.	18.00	30.00– 40.00
Waco, Texas	16.50	32.50–125.00
Watertown, N. Y.	20.00	35.00
Westmoreland Wharves, Penn.	14.75	20.00
Winnipeg, Man.	14.00	22.00
Yakima, Wash.	22.50	

*40% off List.

Stone-Tile Hollow Brick

Prices are net per thousand f.o.b. plant.

	No. 4	No. 6	No. 8
Albany, N. Y.*†	40.00	60.00	70.00
Asheville, N. C.	35.00	50.00	60.00
Atlanta, Ga.	26.50	45.00	53.00
Brownsville, Tex.		53.00	62.50
Brunswick, Me.†	40.00	60.00	80.00
Charlotte, N. C.	35.00	45.00	60.00
De Land, Fla.	30.00	50.00	60.00
Farmingdale, N. Y.	37.50	50.00	60.00
Houston, Tex.	35.00	45.00	60.00
Jackson, Miss.	45.00	55.00	65.00
Klamath Falls, Ore.	65.00	75.00	85.00
Longview, Wash.		55.00	64.00
Los Angeles, Calif.	29.00	39.00	45.00
Mattituck, N. Y.	45.00	55.00	65.00
Medford, Ore.	50.00	55.00	70.00
Memphis, Tenn.	50.00	55.00	65.00
Mineola, N. Y.	45.00	50.00	60.00
Nashville, Tenn.	30.00	49.00	57.00
New Orleans, La.	35.00	45.00	60.00
Norfolk, Va.	35.00	50.00	65.00
Passaic, N. J.	35.00	50.00	65.00
Patchogue, N. Y.		60.00	70.00
Pawtucket, R. I.	35.00	55.00	75.00
Safford, Ariz.	32.50	48.75	65.00
Salem, Mass.	40.00	60.00	75.00
San Antonio, Tex.	37.00	46.00	60.00
San Diego, Calif.	35.00	44.00	52.50

Prices are for standard sizes—No. 4, size 3½x4x12 in.; No. 6, size 3½x6x12 in.; No. 8, size 3½x8x12 in. *Delivered on job. †10% disc.

Wholesale Prices of Slate

Prices given are f.o.b. at producing point or nearest shipping point

Slate Flour

Pen Argyl, Penn.—Screened, 200 mesh (94-96% thru 300 mesh), $7.00 per ton in paper bags.

Slate Granules

Esmont, Va.—Blue. $7.50 per ton.

Granville, N. Y.—Red, green and black, $7.50 per ton.

Pen Argyl, Penn.—Blue-grey, bulk, 6.00 per ton (10c additional per 150-lb. bag). Grey, 6.50 per ton.

Roofing Slate

Prices per square—Standard thickness.

City or shipping point:	3/16-in.	¼-in.	⅜-in.	½-in.	¾-in.	1-in.
Arvonia, Va.—Oxford gray Buckingham	14.62	18.13	23.40	26.33	32.14	40.95
Bangor, Penn.—No. 1 clear	10.50–14.50	24.50	29.00	33.50	44.50	55.60
No. 1 ribbon	9.00–10.25	20.00	24.50	29.00	40.00	51.25
Gen. mediums	9.50–11.25	.....	.....	.....	.....	.....
No. 2 ribbon	6.75– 7.25	.....	.....	.....	.....	.....
No. 1 Albion clear	7.25–10.50	16.00	23.00	27.00	37.00	46.00
Albion mediums	8.00– 9.00	.....	.....	.....	.....	.....
Chapman Quarries, Penn.—No. 1	8.50–11.25	(Vari-tone, 12.00–13.00)				
Medium	7.75– 9.00	.....	.....	.....	.....	.....
Hard vein	.....	16.00	23.00	26.00	32.00	40.00
Granville, N. Y.—Sea green, weathering	14.00	24.00	30.00	36.00	48.00	60.00
Semi-weathering, green and gray	15.40	24.00	30.00	36.00	48.00	60.00
Mottled purple and unfading green	21.00	24.00	30.00	36.00	48.00	60.00
Red	27.50	33.50	40.00	47.50	62.50	77.50
Monson, Maine	19.80	24.00	.....	.....	.....	.....
Pen Argyl, Penn.*						
Graduated slate (blue)	.....	16.00	23.00	27.00	37.00	46.00
Graduated slate (grey)	.....	18.00	25.00	29.00	39.00	48.00
Color-tone	11.50–12.50; Vari-tone, 12.00–13.00; Cathedral gray, 14.00–15.00					
No. 1 clear (smooth text)	7.25–10.50; No. 1 clear (rough text), 8.25–9.50					
Albion-Bangor medium	8.00–9.00; No. 2 clear, 8.00–9.00; No. 1 ribbon, 8.00–8.50					
Slatedale and Slatington, Penn.—						
Genuine Franklin	11.25	22.00	26.00	30.00	40.00	50.00
Blue Mountain No. 1	10.50	22.00	26.00	30.00	40.00	50.00
Blue Mountain No. 1 clear	9.50	18.00	22.00	26.00	36.00	46.00
Blue Mountain No. 2 clear	8.00	18.00	22.00	26.00	36.00	46.00

(a) Prices are for standard preferred sizes (standard 3/16-in. slates), smaller sizes sell for lower prices.
(b) Prices other than 3/16-in. thickness include nail holes.
(c) Prices for punching nail holes, in standard thickness slates, vary from 50c to $1.25 per square.
*Unfading grey, 10.50–12.50; textural, 12.00–15.00; 10% disc. to roofer; 10%–8⅓% to wholesaler.

Cement Drain Tile

Graettinger, Iowa.—Drain tile, per foot: 5-in., .04½; 6-in., .05½; 8-in., .09; 10-in., .12½; 12-in., .17½; 15-in., .35; 18-in., .50; 20-in., .60; 24-in., 1.00; 30-in., 1.35; 36-in.	2.00
Longview, Wash.—Drain tile, per foot: 3-in., .05; 4-in., .06; 6-in., .10; 8-in., .15; 10-in.	.20
Olivia and Mankato, Minn.—Cement drain tile, per ton	8.00
Tacoma, Wash.—Drain tile, per 100 ft.	
3-in.	4.00
4-in.	5.00
6-in.	7.50
8-in.	10.00
Waukesha, Wis.—Drain tile, per ton	8.0c

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted

Culvert and Sewer	4 in.	6 in.	8-in.	10 in.	12 in.	15-in.	18 in.	20 in.	22 in.	24 in.	27 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in.
Detroit, Mich. (c)																	
Sewer	.10	.12	.22	.30	.40	.60	.90	1.20	.....	1.75	2.00	2.50	3.30	4.50	5.75	6.50	8.00
Culvert	.....	.....	.....	.....	.95	1.25	1.60	.....	.....	2.25	2.50	3.00	3.50	5.00	6.50	8.00	10.00
Grand Rapids, Mich. (b)	.....	.....	.....	.60	.70	.90	1.20	.....	.....	1.80	2.10	2.35	3.50	4.00	5.60	6.90	7.85
Houston, Texas	.....	.19	.28	.43	.55½	.90	1.30	.....	1.70†	2.20	.....	.....	.....	.....	.....	.....	.....
Indianapolis, Ind. (a)	.....	.....	.....	.75	.85	.90	1.15	.....	.....	1.60	.....	2.50	.....	.....	.....	.....	.....
Mankato, Minn. (b)	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.50	1.75	2.50	3.25	4.25	.....	.....	.....
Newark, N. J.	6 in. to 24 in., 18.00 per ton																
Norfolk, Neb. (b)	.....	.....	.....	.90	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Paullina, Iowa‡	.....	.....	.....	.....	.....	.....	.....	2.25	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Somerset, Penn.	.....	.....	.....	.....	1.08	1.25	1.65	.....	.....	2.50	.....	3.65	4.85	7.50	8.50	.....	.....
Tiskilwa, Ill. (rein.)	.....	.....	.....	.75	.85	.95	1.20	1.60	.....	2.00	.....	2.75	3.40	.....	6.50	.....	10.00
Tacoma, Wash.	.15	.17	.22	.30	.40	.55	75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wahoo, Neb. (b)	.....	.....	.....	.....	.85½	.....	114	.....	.....	1.81	.....	2.47	3.42	4.13	5.63	6.49	7.31
Yakima, Wash.	.....	.....	.....	.....	.....	.....	1.42	.....	.....	2.11	.....	2.75	3.58	4.62	6.14	6.96	7.78

(a) 24-in. lengths. (b) Reinforced (c) Delivered on job: 5% discount. 10th of month. †21-in. diameter. ‡Price per 2-ft. length.

Ohio Blue Limestone Co. Sold to National Lime and Stone Co.

THE plant and quarry of the Ohio Blue Limestone Co., Marion, Ohio, have been sold to the National Lime and Stone Co., Findlay, Ohio, which now operates nine lime and limestone plants in central Ohio.

According to *Marion* (Ohio) *Star* for the present at least there will be no changes in the management of the limestone quarries which have been taken over by the Findlay firm. E. G. Holzhauer is the manager of the plant. The quarry is located north of Crystal Lake.

Florida Cement Plant Gets Cuban Contract

THE FLORIDA PORTLAND CEMENT CO. has established its product in the markets of Cuba, with a contract just closed to supply cement to two large mosaic tile factories of Havana, one of which is said to be the largest in the world. The office here has received word from Charles P. Sillinan, Havana agent, that the tile plants would use about a carload a week, which will increase shipments to Cuba to nine or ten carloads a month.

The Tampa product was chosen because it is one of the lightest colored portland cements on the market. Use of light colored cement makes it possible for tile manufacturers to reduce the amount of coloring pigments and at the same time get more accurate shades and colors, it was said.—*Tampa* (Fla.) *Tribune*.

Recent Contract Prices

Tacoma, Wash.—The George Schofield Co. of Tacoma submitted the low bid for furnishing 125,000 bbl. of cement for use in the construction of the second unit of the Cushman power project. The bid was $2.98 per bbl. of "Olympic" cement. A discount of 10c per bbl. for cash payment and a refund of 40c per bbl. for return of sacks, brings the net price to $2.48 per bbl., 52c per bbl. lower than paid during the construction of the first unit. Other bids received reached up to $3.21 per bbl.—*Tacoma* (Wash.) *News-Tribune*.

Lafayette, Ind.—Bids for providing gravel for county roads were: Patrick Vaughan, for gravel from the Ninth street road pit, 55c per cu. yd.; John Vaughan, Crane Station pit, 46c; F. M. Widener, 15c at the pit. Figures submitted by Clarence Harshman were: Williams pit, Crane Station, 57c; Mustard farm, 59c; Bank farm near Battle Ground, 55c; Dayton, 57c; Stockwell, 65c, and West Lafayette Country Club, 60c.—*Lafayette* (Ind.) *Courier*.

Clarion, Iowa.—N. E. Hendricks of Scranton was low bidder on the Wright county contract work to be started at once. For $8,586 he will gravel 6.771 miles of primary road No. 15 and place second course gravel on two miles of primary road No. 72 from Galt south.—*Mason City* (Iowa) *Gazette*.

Henry Luther Peaslee

HENRY L. PEASLEE, long prominent in crushed stone operations in the Chicago district, died at the Illinois Masonic hospital, Chicago, on May 25.

Mr. Peaslee was born at Naperville, February 23, 1879, and attended the public schools at that place, North Central College and the University of Chicago. At the age of 18 he became associated with the Dolese and Shepard Co., later becoming secretary-treasurer of that company.

When the United States Crushed Stone Co. was formed he entered that organization as vice-president and general manager and continued as such until the consolidation with the Consumers company. For the past six years his business connections were with the Theodore Kochs Co., of Chicago, making his residence at Naperville.

In 1905, Mr. Peaslee was married to Miss Alice Vincent, of New York, who with a daughter, Helen, and his father, Horace H. Peaslee, of Naperville, survive him.

He was a member of Euclid Lodge, No. 65, A. F. & A. M., the Royal Arcanum and the Loyal Order of Moose.

Oklahoma Gravel Producers Form Association

AT a recent meeting in Tulsa, the Oklahoma Sand and Gravel Association was formed with W. E. Rogers being chosen as president and Fred Ratcliff as vice-president. The new organization will be composed of principal producers in the state and will devote itself to the promotion of co-operation within the industry in the solution of common problems. The need for an association of this kind in Oklahoma has long been recognized and the resulting formation not unexpected.

The present members of the Oklahoma association are the following: Producers Sand Co., Tulsa; Price Sand Co., Tulsa; Tulsa Sand Co., Tulsa; Glenn Sand Co., Tulsa; Smith Sand Co., Tulsa; McMichael Sand Co., Tulsa; Daly Sand Co., Cleveland; Yahola Sand and Gravel Co., Muskogee; West Sand Co., Muskogee, and the Arkansas River Sand Co., Sand Springs.

Retail Prices of Various Rock Products Materials

THE TABLE below gives average prices paid May 1, 1929, by contractors for various rock products, delivered on the job at different principal cities of the United States. These prices were secured through the Bureau of Census.

AVERAGE RETAIL PRICES PAID FOR ROCK PRODUCTS MATERIALS, MAY 1, 1929

City	MATERIAL					
	Portland cement, per bbl. excl. of cont.	Gypsum wallboard, ⅜-in., per M	Hydrated lime, per ton	Building sand, per cu. yd.	Crushed stone, ¾-in., per ton	Gypsum plaster, neat, per ton
New Haven, Conn.	$3.10	.....	$21.50	$1.50	$2.25	.....
Waterbury, Conn.	3.00	$30.00	20.00	1.35	2.45	$18.00
New London, Conn.	3.00	25.00	26.00	1.50	2.40	18.00
New Bedford, Mass.	2.80	25.00	.....	1.75	3.00	14.50
Haverhill, Mass.	3.00	25.00	22.00	.....	.....	15.00
Poughkeepsie, N. Y.	2.28	22.00	24.00	2.50	3.50	18.00
Albany, N. Y.	2.97	24.75	18.00	.....	.....	15.30
Syracuse, N. Y.	3.15	22.50	24.00	2.35	1.80	18.00
Rochester, N. Y.	2.85	20.00	22.00	2.50	2.40	10.00
Buffalo, N. Y.	3.10	25.00	18.00	2.50	2.05	14.00
Paterson, N. J.	2.60	23.00	20.00	1.75	2.08	16.00
Trenton, N. J.	2.40	26.00	18.00	2.03	2.10	17.50
Scranton, Penn.	2.80	30.00	18.00	3.25	.....	17.00
Philadelphia, Penn.	2.61	.....	15.50	1.85	2.45	19.75
Harrisburg, Penn.	2.55	.....	19.00	4.20	1.60	20.50
Baltimore, Md.	2.65	32.50	13.00	2.00	2.75	13.00
Washington, D. C.	2.55	22.50	14.00	.....	.....	14.00
Richmond, Va.	3.10	31.00	17.50	1.95	2.45	20.00
Fairmount, W. Va.	2.90	35.00	17.00	3.40	3.50	18.00
Winston-Salem, N. C.	3.00	23.50	19.00	2.26	3.50	15.00
Columbia, S. C.	2.80	.....	19.00	1.75	2.75	17.00
Shreveport, La.	3.20	.....	22.50	2.00	3.80	24.40
Tampa, Fla.	3.05	.....	24.00	2.00	4.00	20.00
Birmingham, Ala.	2.60	29.90	20.00	3.50	3.00	10.00
Erie, Penn.	2.80	25.00	22.00	2.25	.....	19.00
Canton, Ohio	2.50	33.00	16.00	2.50	3.50	15.00

City	MATERIAL					
	Portland cement, per bbl. excl. of cont.	Gypsum wallboard, ⅜-in., per M	Hydrated lime, per ton	Building sand, per cu. yd.	Crushed stone, ¾-in., per ton	Gypsum plaster, neat, per ton
Akron, Ohio	$3.00	$35.00	$19.00	$2.00	$3.00	$15.00
Toledo, Ohio	.....	22.50	20.00	3.04	2.75	16.00
Columbus, Ohio	2.75	23.00	17.50	2.25	2.50	15.00
Cleveland, Ohio	2.68	.....	16.00	4.73	3.75	12.00
Youngstown, Ohio	2.80	.....	20.00	3.54	2.75	18.00
Detroit, Mich.	2.60	24.69	14.80	2.75	3.00	18.00
Saginaw, Mich.	2.50	25.00	15.00	2.50	2.50	15.00
Terre Haute, Ind.	2.75	28.00	18.00	1.65	3.50	17.00
Rockford, Ill.	2.90	.....	16.25	1.75	2.40	16.00
Chicago, Ill.	2.10	.....	17.00	1.63	1.60	11.50
Milwaukee, Wis.	2.40	25.00	.....	1.90	2.25	18.00
Lansing, Mich.	2.85	.....	22.00	2.25	2.25	16.00
Des Moines, Iowa	2.66	23.75	20.00	1.00	3.60	10.50
St. Louis, Mo.	2.45	.....	18.00	2.70	1.90	10.00
Kansas City, Mo.	2.10	25.00	24.00	1.75	1.85	10.00
St. Paul, Minn.	2.70	25.00	21.00	1.50	2.60	16.00
Sioux Falls, S. Dak.	3.10	27.00	26.00	1.50	2.25	16.00
Grand Forks, N. D.	3.00	.....	.....	2.60	.....	16.00
San Antonio, Tex.	2.82	30.00	20.00	2.10	2.35	12.50
Tucson, Ariz.	3.71	.....	30.00	1.25	2.00	18.00
Los Angeles, Calif.	2.64	34.00	24.00	1.70	2.05	10.00
Long Beach, Calif.	2.48	32.50	25.00	1.89	2.30	11.10
San Francisco, Calif.	2.80	.....	25.50	1.25	1.40	20.00
Seattle, Wash.	2.65	32.50	22.00	1.65	.....	20.00
Portland, Ore.	2.60	27.50	25.00	2.00	1.60	19.00

News of All the Industry

Incorporations

Westchester Readymix Concrete Co., New York City, $250,000. Orem T. Wharton, Dover, Del.

Trav Rock Co., New York City, $20,000. M. Weintraub (305 Broadway, New York City).

Ohio River Sand Co., Louisville, Ky., increased capital to $2,560,000 from $360,000.

S. W. Barrick and Sons, Inc., Woodsboro, Md. To mine and quarry limestone, manufacture lime, etc.

Acme Gravel, Sand and Material Co., Jackson, Miss., $75,000. F. T. Payne, S. A. Gans and A. H. Alvis of Jackson.

National Stone Quarries Corp., Albany, N. Y., $450,000. C. M. Collier, J. J. Casey and R. C. Killough, Jr., of Watervliet, N. Y.

Scranton Gravel Co., Little Rock, Ark., $15,000. T. J. Haney, L. P. Briggs (Home Insurance Bldg., Little Rock).

McCune Bros., Morristown, N. J., $50,000. H. M. Cone, Morristown. To manufacture cement products.

Concrete Railroad Tie Co., Madison, Wis., 100 shares common, no par value. G. Davey, R. Vincent and A. Kilmer.

Reliable Block and Tile Co., Sheboygan, Wis., 250 shares common, $100 each. B. Voskuil, J. Voskuil, H. Schreirs.

Platte Sand and Gravel Co., Fremont, Neb., $35,000 (350 shares, $100 each). Charles H. Yost and Carl A. Manska.

Worcester Concrete Block Co., Inc., Worcester, Mass., $10,000 (100 shares, $100 each). Joseph Manchetti, Albert Zickell, 1238 W. Boylston St., Worcester, and Nuniziato Fusaro.

Nelson Sand and Gravel Co., Inc., Quincy, Mass., 100 shares of no par value. A. R., N. A. F. and M. R. Nelson. Address: 5 Nelson St., East Braintree, Mass.

Arkadelphia Sand and Gravel Co., Arkadelphia, Ark., $50,000. To deal in sand, gravel, lime and cement. C. C. Hawkins, A. D. Mason and R. W. Huie, Jr.

Kewaunee Gravel Co., Milwaukee, Wis., 200 shares preferred, $100 each; 200 shares, no par value. To produce sand, gravel, concrete products, etc. C. Schneider, G. Wry, H. Gaeth.

Bristol Sand and Gravel Co., Philadelphia, Penn., 2000 shares, no par value. J. Vernon Pimm, Albert G. Bauer, Philadelphia; R. L. Spurgeon, Wilmington, Del.

Desplaines Concrete Co., Inc., Des Plaines, Ill., $10,000. To manufacture cement products. Charles Gatzke, J. W. Wigham and Coram T. Davis (366 W. Adams St., Chicago).

Neuberger Chemical Corp., New York City, $90,000, 100,000 shares common. To deal in cement, lime, concrete, etc. G. Everett, New York City; C. S. Peabbles, L. E. Gray, Wilmington, Del.

Sand and Gravel

Iron City Sand and Supply Co., Pittsburgh, Penn., has moved to its new offices at 3001 Grant Bldg., Pittsburgh.

Richmond Sand and Gravel Co., Richmond, Va., is to build new docks and equipment at its James river operation at a cost of $500,000.

Schmidt Sand and Gravel Co., Iowa City, Iowa, has moved to a new location here on the south river road across from the flying field.

Wallace & Gilbert, Ocean City, N. J., submitted the lowest bid to the city commissioners for furnishing the city with gravel. The bid was 90c per ton and 10c per mile additional for hauling.

Iowa Southern Utilities Co., Newton, Iowa, has donated a carload of gravel for the two roads leading to the airport of that city. The gift is the fourth of its character donated by the company to this project.

Standard Gravel Co., Inc., Shreveport, La., has started erection of a $70,000 gravel plant at Camden, Ark. Modern equipment will be installed and a 1½-mile spur to the Missouri Pacific railroad is to be constructed.

Langlade County, Wis. The county highway commission has purchased three gravel pits to take care of current road construction program. One is located on highway E, near Lily, Wis., one on highway D, and the third in the town of Parrish, Wis.

Winchester, Tex., is to have a new sand and gravel plant soon. It is reported that Walter A. Peter, dealing in land in Fayette county, has entered into a contract with a large sand and gravel company for a considerable portion of his sand and gravel holdings.

Lansing, Mich. A petition has been presented to the city council by residents in the vicinity of the Hunter gravel pit here. The complaint made is that the pit holds a lake of stagnant water ranging in depth from 20 to 60 ft., and that lots in the locality have been undermined by the action of the water in the lake.

East Liverpool Sand Co., East Liverpool, Ohio, and Eastern Sand and Supply Co., Steubenville, Ohio, have been merged under the latter company's name. The combine, which owns seven Ohio river islands between the Ohio-Pennsylvania border and Steubenville, will maintain headquarters at East Liverpool. Albert E. Frosch is general manager.

Western Indiana Gravel Co., Terre Haute, Ind., reports continued increase in volume of business. The company operates eight plants, including three in Illinois at Dundee, Warsaw and Metropolis, one at Miono, Mich., two at Anderson, Ind., and two at Terra Haute. A large brick warehouse was recently erected at the Terre Haute retail yard for storage purposes.

Springfield, Ill. Attorney General Oscar Carlstrom has given legal approval to the proposal of L. D. Cornish, chief engineer of the Illinois state division of waterways that the state open its own gravel pit to supply material for completion of the Dresden Island project. In a letter to the department the attorney general stated the legality of the move is beyond question, the Illinois waterways act providing in substance that "in the construction of such waterway your department may do the same or any part thereof by direct employment of materials and equipment and may procure and employ and procure for such purposes the necessary employes, machinery and equipment."

Quarries

Premier Granite Quarries, Inc., La Grange, Tex., is planning the development of a 250-acre quarry property at Llano, Tex., to cost over $60,000 with machinery. L. W. Stolz is vice-president.

Tatesville, Ky. The state rock quarry here is being opened to furnish material for the road from Somerset to the Tennessee state line. Fifty convicts will be employed.

Kuenzli Stone Quarries, Upper Sandusky, Ohio, are being kept busy supplying material for the new section of the Lincoln highway west of the city.

Godfrey Marble and Tile Co., Inc., Atlanta, Ga., has leased a large travertine deposit at Cuthbert, Ga., following a survey made by S. W. McCallie, state geologist, and Richard K. Meade, Baltimore, Md. The Investment Bankers Corp., New York, is reported to be interested.

Neskowin, Ore. A fine rock deposit has been discovered on the federal forest reserve four miles south of here and a contract will be let for the erection of a quarry plant. The state will be the chief purchaser, as its road program calls for 40,000 yd. of crushed rock for road construction.

Cement

Beaver Portland Cement Co., Gold Hill, Ore., having a large supply of cement on hand, has suspended production for 30 days, during which time its entire operating crew will be employed in making annual repairs.

San Antonio, Tex. Cement for a sewage treatment plant, to be erected on the South Loop of the city at a cost of $1,250,000, will be purchased from local producers in accordance with orders issued by Mayor C. M. Chambers of that city.

San Antonio Portland Cement Co., San Antonio, Tex., entertained members of the Rotary Club at its plant club house June 7. The members were guests of Charles Baldus and William Beck, Rotarians and company officials. Approximately 200 attended, of whom 30 were present at a luncheon of the club at the plant 14 years ago. The club members inspected the plant, after which luncheon was held in the community hall, owned by employes of the plant. During the luncheon the cement company's 30-piece band entertained. Ed Marble of Worcester, Mass., who is visiting here after attending the Rotary International in Dallas, was the principal speaker. He spoke of "Unique Rotary," telling of ways in which the organization is different from all others. Many out-of-town guests were present, including Pompeo Coppini, famous New York sculptor and former resident of San Antonio. He made a short talk.

Cement Products

Piedmont Quarries, Winston-Salem, N. C., has established a concrete mixing plant at its quarries at Waughtown, N. C. A fleet of trucks for hauling mixed concrete has been ordered.

Fred J. Koerner, Elizabeth, N. J., has installed a new cement products plant and is now manufacturing block, tile and sundry materials.

L. G. Everist, Inc., Sioux City, Iowa, has opened a central ready-mixed concrete plant at its yards. The plant will have a capacity of about 600 cu. yd. per day of required concrete mixes. Special trucks have been put in service for deliveries.

Art Stone and Tile Co., Wilmington, Del., is operating on a capacity schedule, and its force is now working on an overtime basis. Among a number of contracts in hand for cast stone trimming is one for a building of the Baldwin Locomotive Works at Eddystone, Penn.

Lime

Woodville Lime Products Co., Toledo, Ohio, has moved its general offices to new quarters at 2140 Jefferson Ave., Toledo.

Silica Sand

Caryville, Tenn. Gray-Knox Marble Co., Knoxville, Tenn., and other marble companies here are developing silica deposits recently discovered in Clinch Mountain, near Caryville. The principal product will be silica sand for cutting and polishing marble.

Feldspar

United Feldspar Corp., New York, recently organized to take over and consolidate group of feldspar producing companies in Maine, New York and other points, will expand plant of Oxford Mining and Milling Co., West Paris, Me., including installation of equipment of double present capacity. A tramway system will be built from mines to mill. C. H. Peddrick, Jr., is vice-president.

Personals

W. R. Oglesby, of Chester, Ill., has joined the technical staff of the Carney Co., Mankato, Minn., as a research chemist on cements.

C. R. Messinger, president of the Chain Belt Co., Milwaukee, Wis., was elected a director of the Milwaukee Gas Light Co., affiliated with the American Light and Traction Co. of New York.

Thomas Stillwell, Independence, Mo., an employe of the Consumers Material Co., which operates a rock quarry east of Independence, was severely injured while dressing a belt on a machine. His clothing became entangled and he was thrown against a set of gears.

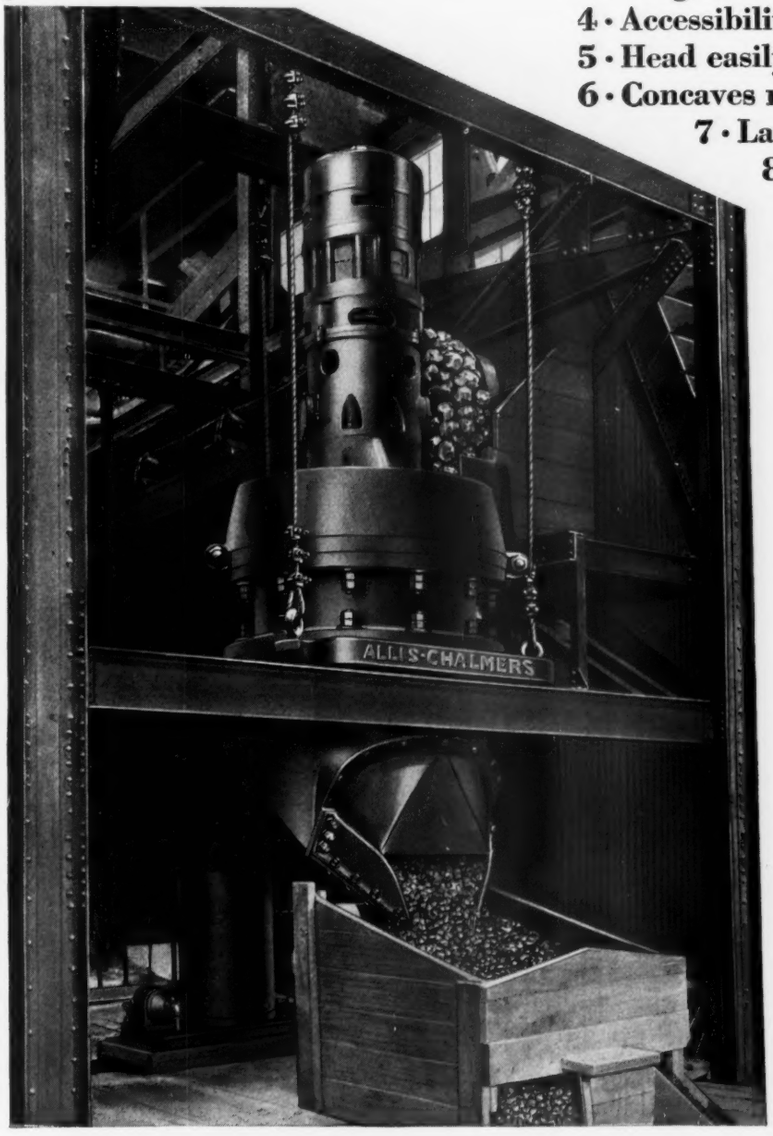
Frank Buetin, veteran sand and gravel man of Dubuque, Iowa, has joined the Molo Sand and Gravel Co. and the firm of Linehan & Molo, and will be head of the sales force of the two concerns. Mr. Buetin for many years was head of Frank Buetin, Inc., one of the best known sand and gravel firms of Dubuque in former years.

the Style "B"

Newhouse Crusher

The crusher that needs *no foundations*

10-inch Style "B" Newhouse Crusher operating in large commercial crushed stone plant.



Ten Outstanding Features:

1 · Crusher suspended by cables.
2 · Motor direct connected.
3 · No gears.
4 · Accessibility of working parts.
5 · Head easily adjustable for wear.
6 · Concaves reversible.
7 · Large unobstructed feed openings.
8 · Maximum size feed compared to receiving openings.
9 · Short, rapid crushing stroke.
10 · Uniformity of finished product.

Samples of crusher products have been taken to determine screen analysis under actual operating conditions. One of these is shown below. This sample was taken of the product of a 10″ machine crushing limestone and set at 1½″ open side. The analysis was made on flat testing sieves.

100.0% passing 2¼″ round hole
99.4% passing 2″ round hole
97.6% passing 1¾″ round hole
91.5% passing 1½″ round hole
78.4% passing 1¼″ round hole
63.7% passing 1″ round hole
48.9% passing ¾″ round hole
33.5% passing ½″ round hole
21.8% passing ¼″ round hole
13.4% passing ⅛″ round hole

Write for Style "B" Newhouse Crusher Bulletin 1469

ALLIS-CHALMERS

MILWAUKEE, WIS. U.S.A.

When writing advertisers, please mention ROCK PRODUCTS

Obituaries

Frank R. H. Moritz, 54, Egypt, Penn., quarry superintendent of the Lehigh Portland Cement Co., died of a heart attack June 3. The heart attack which proved fatal to Mr. Moritz resulted from a cold which he contracted while motoring the previous day. Mr. Moritz was born in Hokendauqua, a son of William and Sarah Dilcher Moritz. He had been employed by the Lehigh Portland Cement Co. for 27 years. He is survived by a son, Preston J., and a grandson, Frank P., who resided with him; two brothers, George R. H. Moritz, of Fogelsville, and Reuben Moritz, of Iola, Kan., and a sister, Mrs. Earl Faust, of Hokendauqua.

Manufacturers

Broderick and Bascom Rope Co., St. Louis, Mo., has appointed Wells Fargo & Co. Express, S. A., as distributors of its wire ropes in Mexico.

Wagner Electric Corp., St. Louis, Mo., has moved its Buffalo service station and branch sales office to a new building at 1796 Main St.

Pennsylvania Pump and Compressor Co., Easton, Penn, announces that it has appointed Wells Fargo & Co., Express, S. A. Apartado Postal 361, as their agents for the republic of Mexico.

Brown Instrument Co., Philadelphia, Penn., has moved its Boston office from 161 Devonshire St. to 1107 Public Service Bldg., 89 Broad St., Boston, Mass.

International Combustion Engineering Corp., New York City, at its recent annual meeting, elected Nathan L. Amster a director to fill a vacancy. Retiring directors were re-elected.

Bethlehem Steel Corp., Bethlehem, Penn., according to a newspaper item, will spend about $10,500,000 in replacement and renewals at its Cambria plant at Johnstown, Penn.

Ford Chain Block Co., Philadelphia, Penn., announce the appointment of C. A. Anderson as sales manager with headquarters at the general offices in Philadelphia.

Chain Belt Co., Milwaukee, Wis., announces that R. T. Steindorf, assistant to W. B. Marshall, conveyor sales manager, has been transferred to the Cleveland office of the company.

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn., at its recent directors' meeting elected J. S. Tritle, in charge of manufacturing operations, as a vice-president.

M. A. Long Co., Baltimore, Md., announces the opening of a branch office in the Commonwealth Bldg., Allentown, Penn. E. C. Machin, for some time in charge of building construction for the company, will be resident engineer.

Jeffrey Manufacturing Co., Columbus, Ohio, has appointed John L. Connors assistant general manager. Mr. Connors is a graduate of Purdue University and for the past nine years has been president of the Morgan-Gardner Electric Co.

Baldwin Locomotive Works, Philadelphia, Penn., announces that Samuel E. Vauclain, chairman of the board, was elected chairman of the Standard Steel Works, a Baldwin subsidiary. George H. Houston, president of Baldwin Locomotive, was elected president of Standard Steel Works.

Continental Motors Corp., Detroit, Mich., has opened a branch office in Los Angeles. Ray Long, who has been associated with the company for a number of years as assistant sales manager of the industrial division, has been appointed western district manager.

Union Carbide and Carbon Corp., New York City, has moved the Chicago district and central division offices of its various units, including the Linde Air Products Co., Prest-O-Lite Co., Inc., Oxweld Acetylene Co., and Haynes Stellite Co., to the new Carbide and Carbon Bldg. at Michigan Ave. and South Water St., Chicago.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis., is rushing work on the large addition to the plant of its tractor division, in which special tooling and all assembling of the United Tractor is to be done. It is to be completed July 1. The company has also completed a large special foundry section for the exclusive production of United Tractor castings.

Lincoln Electric Co., Cleveland, Ohio, announces the recent appointment of new district sales representatives. B. W. Brown has been advanced to district sales representative with headquarters at Milwaukee, Wis. G. O. Forseth, formerly a sales representative at Detroit, has been promoted to district sales representative with headquarters at Minneapolis, Minn.

Macdonald Engineering Co., Chicago, Ill., has completed a second packing station and baghouse for Marquette Cement Mfg. Co.'s LaSalle, Ill., plant, and eight storage silos with a total capacity of 140,000 bbl. at Lone Star Cement Co.'s plant at Dallas, Texas. They are now constructing a crusher building for the latter plant, and an agitator basin and pump pit for the Monolith Portland Cement Co., Monolith, Calif.

Harbison-Walker Refractories Co., Pittsburgh, Penn., at its recent annual stockholders' meeting re-elected its directors, and at a directors' meeting immediately following elected as officers: H. W. Croft, chairman; J. E. Lewis, president; O. M. Reif, N. McQuillen, Kenneth Seaver and Raymond Willey, vice-presidents; P. R. Hilleman, secretary, and W. Forman Eickel, treasurer. The following appointments are also announced: G. G. Coolidge as assistant to the president, and W. B. Coullie as general sales manager.

Patterson Foundry and Machine Co. East Liverpool Ohio, announce the formation of Patterson Steel Products Co., which has been incorporated with a capital stock of $150,000. The new company has purchased a site adjacent to the property of the Patterson Foundry and Machine Co. and will start immediately the erection of a plant for the manufacture of welded steel products of all kinds. Richard L. Cawood is president and D. G. Rhue general manager of the Patterson Steel Products Co.

Joseph T. Ryerson and Sons, Inc., Chicago, Ill., announces the following new elections and appointments to its executive staff: A. M. Mueller as assistant secretary and member of the board of directors; H. B. Ressler, general manager of sales, succeeding Mr. Muller; R. C. Ross, from general traffic manager to assistant to the president in charge of plant operations; W. H. Bryant, Chicago sales manager; G. H. Rumpf, manager, St. Louis plant; H. W. Treleaven, assistant treasurer. The men elected have all been with the company for a long period of time.

Linde Air Products Co., New York City, announce that their new oxygen producing plant at 1000 W. Washington Ave., Oklahoma City, Okla., commenced operations on May 17. F. K. Buckalow is superintendent and A. B. Curtis, whose headquarters are at Dallas, Tex., is district superintendent. The company has also added a new plant at 150 Stockton St., Jacksonville, Fla., to its chain. E. H. Blount is superintendent of this plant and J. Erskine, whose headquarters are at the Birmingham Linde plant, is district superintendent. The new Louisville, Ky., plant started producing oxygen on May 29.

Construction Machinery Co., Waterloo, Iowa, has appointed the following distributors for its products in the state of Texas: R. B. George Machinery Co., Dallas; McMillin Machinery Co., Houston; B. P. Clark Machinery Co., San Antonio; Plains Tractor and Implement Co., Amarillo; West Texas Tractor and Machinery Co., Plainview, and Golay-Kirkpatrick Tractor and Implement Co., Harlingen. Also the following agents to handle their line of equipment: George V. Treen, 520 Monroe Bldg., Charleston, W. Va.; Bournival & Co., 336-340 Notre-Dame E., Montreal, Can., and Construction Equipment Co., 310 Dooly Block, Salt Lake City, Utah.

Trade Literature

NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention **Rock Products.**

Concrete Tile. Bulletin describing and illustrating "Supertile" equipment and plants. THE MACGLASHAN CORP., Tecumseh, Mich.

Ox-welding Pressure Vessels. Description of construction method used. Illustrated. LINDE AIR PRODUCTS CO., New York.

Rod Mills. Broadside on Hardinge equipment for sand-lime brick plants. HARDINGE CO., York, Penn.

Fire Brick. Bulletin covering features of firebrick manufacture by Laclede-Christy. CLAY PRODUCTS CO., St. Louis, Mo.

Osgood "Commander." Bulletin **2900** on the new two-speed "Commander," a convertible gasoline excavator. THE OSGOOD CO., Marion Ohio.

Nickel Alloy Steels. Buyers' guide listing concerns handling nickel alloy steel products. THE INTERNATIONAL NICKEL CO., INC., New York.

Safety Push Buttons. Broadside describing novel safety push button available for all electrical equipment. LINCOLN ELECTRIC CO., Cleveland, Ohio.

Time Current Control. Describing the new E C & M system of d.c. magnetic contactor control. ELECTRIC CONTROLLER AND MANUFACTURING CO., Cleveland.

Improved Vibrex Screen. Bulletin No. **73** illustrating and describing the mechanical features of the improved machine. ROBINS CONVEYING BELT CO., New York.

Locomotives. Two folders on oil-electric locomotives of the 4- and 8-wheel type and of various capacities. GEORGE D. WHITCOMB CO., Rochelle, Ill.

Transformers. Bulletin No. **161,** containing instructions for the installation and operation of power and distribution transformers. WAGNER ELECTRIC CORP., St. Louis.

Power Graders. Illustrated folder on models "E" and "ER" power graders, and attachments that may be had for use in connection with them. W. A. RIDDELL CO., Bucyrus, Ohio.

Crushers. Broadside on gyratory and jaw crushers for use in the cement and other industries. TRAYLOR ENGINEERING AND MANUFACTURING CO., Allentown, Penn.

Oil Engines. Bulletin No. **201,** covering two-cycle, semi-Diesel oil engines in sizes from 30 to 125 hp. Completely illustrated. WEBER ENGINE CO., Kansas City, Mo.

Bucket Carriers. Catalog No. **152,** completely describing and setting forth the advantages of the "Rex" pivoted bucket carrier. CHAIN BELT CO., Milwaukee, Wis.

Drill Sharpeners. Bulletin No. **72-N** on light model drill sharpener. Fully illustrated, with details and pictures of the machine at work. SULLIVAN MACHINERY CO., Chicago, Ill.

Gas Engines. Bulletin No. **782** on vertical gas engines, type RHG 75. Completely illustrated and giving construction details and specifications. CHICAGO PNEUMATIC TOOL CO., New York City.

Sand and Gravel Equipment. Compactness in plant design and economical production of sand and gravel are taken up in a folder entitled "Simplicity in Large Sand and Gravel Plant." WEBSTER MFG. CO., Chicago, Ill.

Spiral Conveyors. Catalog **36D** illustrating and describing spiral conveyors for receiving, distributing and handling materials. Specifications, price lists and data on design. WELLER MANUFACTURING CO., Chicago.

Closed Circuit Grinding. Reprint of "Closed-Circuit Fine Grinding and What It Should Accomplish in the Cement Industry," by A. Anable. Published in ROCK PRODUCTS, January 5, 1929, issue. THE DORR CO., New York.

Electric Tools. Catalog No. **18** featuring portable electrical equipment such as drills, grinders of all kinds, refacers, screw drives and accessories for the same. BLOCK AND DECKER MANUFACTURING CO., Towson, Md.

Power Drag Scrapers. Handy reference book giving a brief review of their many uses, necessary equipment and data on typical installations. CONSTRUCTION MACHINERY CO., Waterloo, Iowa.

Turbine Water Wheels. Bulletin **W203,** first of series showing typical water wheels. Bulletin features open penstock installation with submerged type gate operating mechanism. JAMES LEFFEL AND CO., Springfield, Ohio.

Low Pressure Blowers. Bulletin No. **22-B1** on low pressure type rotary blowers, equipped with various bearings, for any capacity at pressure of 2½ lb. or less. THE P. H. AND F. M. ROOTS CO., Connersville, Ind.

Gravel Equipment. An 80-page booklet, completely illustrated, with full details and specifications on the complete line of Pioneer gravel equipment. PIONEER GRAVEL EQUIPMENT MANUFACTURING CO., Minneapolis, Minn.

Construction. "Fitting Construction Procedure to Modern Requirements," as the title implies, outlines steps consistently followed by buyers of construction and points out how this procedure has led to satisfaction. MORTON C. TUTTLE CO., Boston, Mass.

Early-High-Strength Portland Cement. "A New Record With 'Incor'" is the title of a strikingly illustrated booklet setting forth the advantages of "Incor" high-early-strength portland cement and containing data on the use of this material in construction. INTERNATIONAL CEMENT CORP., New York City.

Heavy Duty Chains. Pamphlet containing tables showing the number of links per foot, weights, proof tests and safe working loads of the different sizes of crane or dredge chain and other information which buyers and users of chain will find valuable for their files. AMERICAN CHAIN CO., INC., Bridgeport, Conn.

Plant Lubrication. A 56-page booklet on industrial plant lubrication, completely illustrated and outlining the progress and development of lubricants to meet diverse conditions, relation of correct lubrication to plant efficiency, lower maintenance costs, labor-saving, decreased power consumption, prevention of accidents, etc. E. F. HOUGHTON & CO., Philadelphia, Penn.

Dredging Equipment. A 20-page booklet for sand and gravel producers using pump dredges; completely illustrated and describing in detail the "Swintek" suction screen nozzle ladder, and how it cuts into the packed strata of mud and cemented gravel and automatically removes boulders, driftwood and debris which tend to choke the pipe line system from the digging zone. EAGLE IRON WORKS, Des Moines, Iowa.